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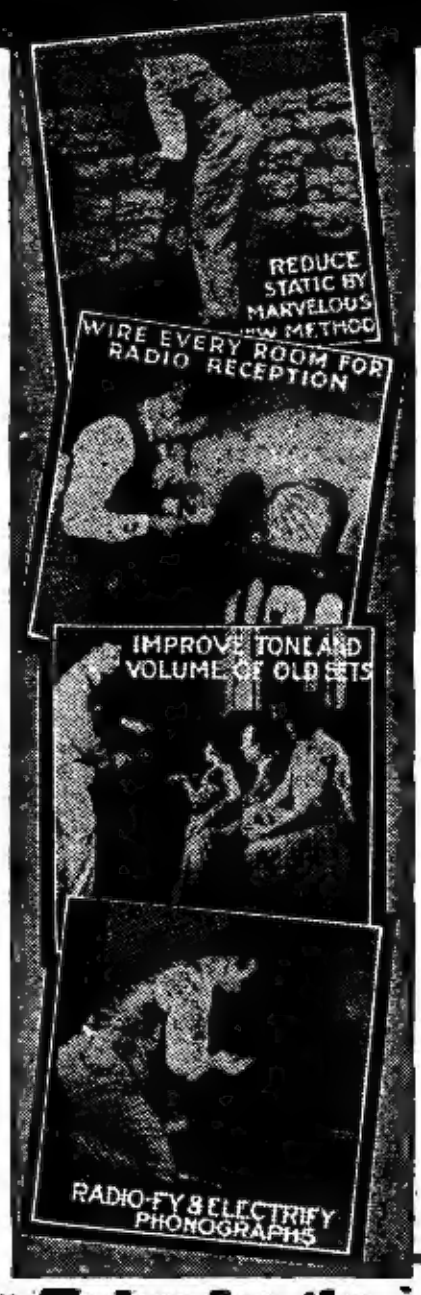
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ON THE COVER

this month is shown an incident from "An Adventure in Time." Our time explorer walks blithely through the air over the city of the future in which he has suddenly found himself. On his feet are shoes holding the small turbines that compress the air beneath him, thus giving him a cushion on which to walk.

NEXT MONTH

THE CITY OF THE LIVING DEAD, by Fletcher Pratt and Laurence Manning. This story by two authors of the first rank contains a subject so unusual that we are sure it will create a sensation. It is well known that we are aware of each experience that we have only because our sense organs have transmitted certain impressions to us. Suppose it were possible to substitute a mechanism which will allow us to have any experience we wish without physically undergoing it. That such a thing will create the most revolutionary change in human life, our authors convincingly show.

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THE TIME RAY OF JANDRA, by Raymond A. Palmer. Most of the time traveling stories that we publish are those dealing with the future. But under restricted conditions it is just as possible for one to travel into the past and discover the truth of many of the mysteries which fill the pages of man's history. There are many civilizations, such as that of Atlantis, which have presented an eternal question mark to our most industrious historians. In this splendid story, Mr. Palmer takes us back into the past and gives us a swiftly-moving tale of the adventures that will confront one in the strange land and time.

THE EVENING STAR, by Dr. David H. Keller. We come to the concluding installment of this remarkable sequel to "The Conquerors." If the incidents that Dr. Keller pictures, or the strange creatures that his fertile mind has conjured, seem to be impossible to us, we can turn to many scientific authorities who state that the forms that life may take are almost limitless. Those who have watched the strange career of the Conquerors will find in this installment a culmination that is sudden, breath-taking, and for our human race quite satisfying.

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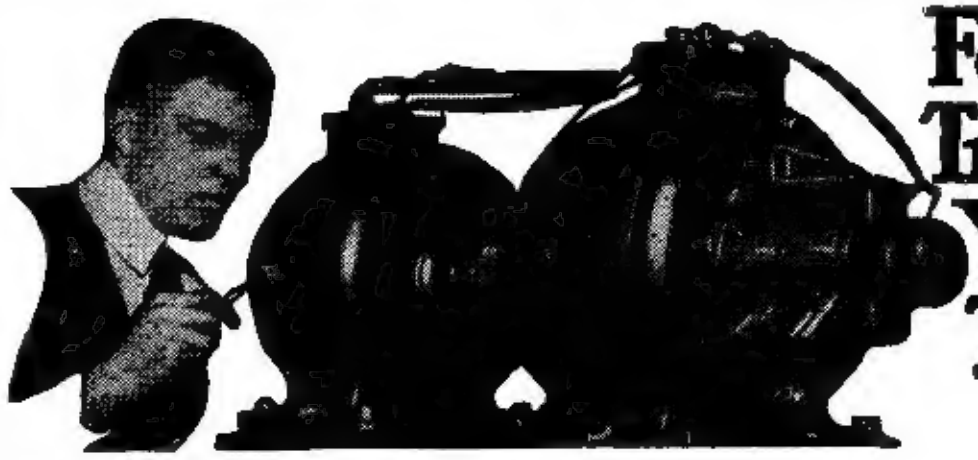

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"I knew nothing about Electricity, before I went to Coyne," says Nolan H. McCleary. "I had no advanced education and so little money that I could never have stayed at school, if Mr. Lewis hadn't gotten me a part-time job. Yet I finished the course in twelve weeks, and the School immediately placed me in a fine electrical job. Now I am Chicago District Manager of the largest electrical concern of its kind in the world, making more money than I ever dreamed of making before I went to Coyne. I am convinced that there is but ONE RIGHT WAY to learn electricity and that

NOLAN H. McCLEARY
Chicago District Manager, Beardsley-Wolcott Co.

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"Before going to Coyne, I made thirty cents an hour. I borrowed the money for my tuition and you got me a part time job that took care of my expenses. I graduated in twelve weeks, returned home and started doing wiring on contract. In a year's time, I had paid for my schooling, bought a car and had a nice shop of my own. In your catalog you say a fellow can make $60.00 to $200.00 a week. I have done better. In July I made $180.00 to $200.00 a week, and I have made as high as $75.00 a day."

Joseph F. Hartley, West Virginia.

His Advice—"Go To Coyne"

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R. M. Ayers, Louisiana.

Nothing Compares to Practical Training

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D. G. Emerson, Michigan.

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THE WONDERS OF STELLAR SPACE

By HUGO GERNSBACK

EMINENT scientists have given a great deal of attention lately to the physical aspects of interstellar space. While it is true that so far no one has actually navigated the outer space, the physical laws that govern matter on earth will hold good for this space, in most cases.

Conflicting statements as to the nature of interstellar space have often been made, not only by science fiction writers, but even by serious scientists.

One of the questions which arise most frequently in connection with interplanetary travel is that of the temperature that exists in free space. Certain writers have it that space is at the absolute zero (minus 273 degrees centigrade); others say that space has no temperature of any kind, while still others veer toward the theory that the temperature is that of the melting point of certain metals.

In truth, free space itself has no temperature whatsoever. A little reflection will easily verify this. Heat exists only when there are particles of matter that will conduct such heat from one to another. If there are no such particles there is no temperature. In other words, temperature is the measure of the heat or rate of vibration of material particles; molecules and atoms. Therefore, there can be no measure of the temperature of space wherein there is no matter. The energy which is sent through free space, let us say from one star to another, or from the sun to the earth, is propagated, not by heat waves, but rather by electromagnetic waves. Such waves have no heat; but some of these waves have the property of creating heat effects when they strike any material body: solid, liquid, or gaseous.

It is quite possible that, of two bodies—one black, the other white—which are moving in a parallel course at the same speed through open space, one—the black one—can by solar radiation become red hot and the other—the white one—remain at the absolute zero. Yet the two bodies can travel together separated by less than an inch and retain these temperature values. The reason is that the heated body cannot transmit its heat to the cold one because there is nothing between the two to conduct the heat in empty space. If both were surrounded by air, such as exists on earth, the cold body would soon absorb the heat from the hot one, which in empty space is not possible.

Sunlight or starlight comes to us in short waves, and if our hypothetical body, as explained above, is red hot, it is true that by radiation it will lose some of its heat; but it can do so only through the means of long, invisible waves.

Black bodies have the property of absorbing a great deal of radiant energy; but they also lose it quickly. White bodies absorb very little heat; however, they do retain it much longer because they do not lose it through radiation. For this reason, it has been variously suggested by scientists that space-flyers should be painted dull black on the side turned toward the sun; whereas the side in darkness should be a shiny white. By this means, a maximum of heat is absorbed, while a minimum is lost by radiation.

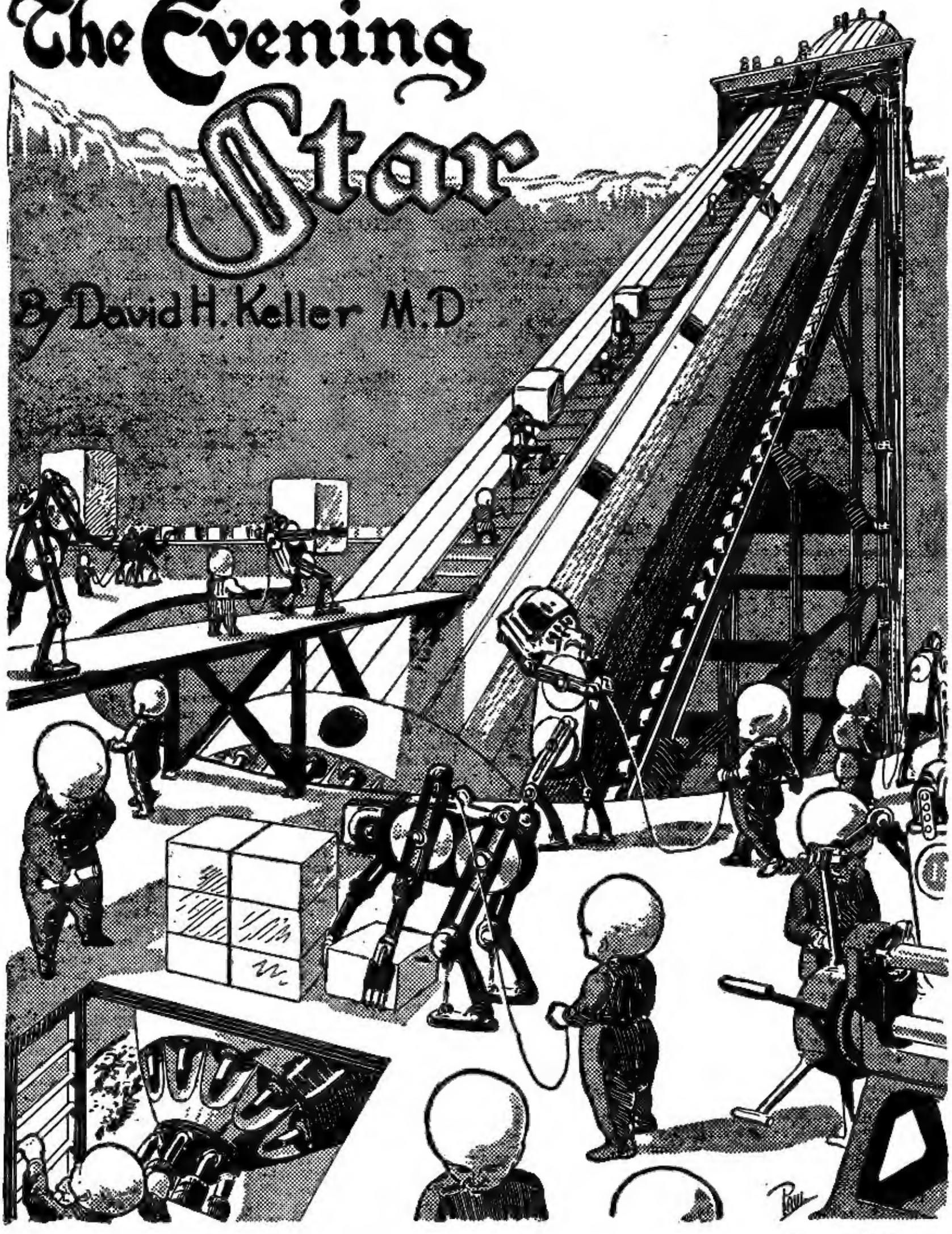
Strange as it may appear from this, it will be seen that, once we have space-flyers, it will be possible to navigate interplanetary space without taking any artificial heat along. There will be plenty of heat from the sunlight, whereas very little heat will be lost through radiation. It should be noted that, under such circumstances, the animal heat of the passengers themselves will almost be sufficient to keep the temperature within livable range. It should not change greatly, no matter where the space-flyer is.

These new thoughts bring us to all sorts of strange and hitherto almost unbelievable truths. For instance, as the well-known Professor Hermann Oberth, the expert on the science of space-flying, points out, it will be possible to approach our sun to within a few thousand miles of its atmosphere. All that is required for this feat is to turn the silver polished side of the space-flyer towards the sun while the black side is turned away from it. By this means, so long as one keeps actually outside of the sun's burning vapors, it will be possible to make observations from the space-flyer without being consumed. The reason here, of course, is that on the shiny side the sun's rays are reflected back to the source, while the black side, by radiation, will instantly radiate whatever heat is transmitted through the polished side and so through the interior of the space-flyer.

A similar principle holds through for inmates of space-flyers who wish to leave their ship to explore space. As long as they wear suitable clothes, which can be made of leather or rubber and, of course, air-proof to maintain a pressure approximately 14.7 pounds per square inch on their bodies, all that is necessary is to have one side black, the other made of polished metal (which might be a light material such as aluminum foil). As long as the explorer floats with the black side turned towards the sunlight and the polished side away from it, he will be quite comfortable; and will receive sufficient energy from the sun to keep him comfortable, while he will radiate the heat no faster than he gets it. For this reason, it is not necessary for him to take along any artificial heat, and there will be no danger of his either freezing on one side or roasting on the other.

The Evening Star

By David H. Keller M.D.



(Illustration by Paul)

For the next weeks there was a hum of ceaseless activity around the giant craft guided by the super-human intelligence of the Specialists. . . .

THE EVENING STAR

By the Author of "The Human Termites," "The Conquerors," The Boneless Horrors," etc.

"TELL him I'm busy; he'll have to come back."

The little white-haired man spoke without turning his head, so intensely interested was he in the vision in the telescope through which he was looking.

The assistant scratched his head in perplexity.

"But he seems bound to see you," he stammered at last. "Tell him I'll attend to him tomorrow."

The young man left the observatory and the little man, in perfect silence, again gave his undivided attention to the stars.

But his solitude was again broken by the sound of a hearty greeting. Before he had time to turn around with a reprimand, strong arms had seized him and swept him from his seat, lifting him up in the air. Angrily, he turned on his assailant, but his frown changed to a look of astonishment, and then a smile.

"Harry, dear lad!" he cried, "Where did you come from? I haven't heard of you for so long, that I thought you were lost for good in some wilderness."

"So, you're really glad to see me, Percy?" asked Sir Harry Brunton, "You didn't seem so when you told your student that I could wait till tomorrow. My word! Think of it! Not seeing you for years and then having to wait till tomorrow! After all the good times we had at the old University, too."

DR. D. H. KELLER

And then the big man tenderly put the little man down into a comfortable chair, drew another chair close, pulled out his briar pipe, filled and lit it, and, between the puffs, fairly beamed at his friend.

"It's awfully good to see you again, Harry," whispered the little, old man. "I suppose you've been into all kinds of deviliment since we last met?"

"Hardly that; but I have knocked around a bit! I suppose you've sowed a fair amount of wild oats yourself, eh, what?"

The astronomer laughed.

"Not so many, Harry. You know how I was at the University; always up at night looking at the pretties in the skies and then so sleepy the next day that you had to help me with my lessons. Well, after I graduated, I put more than half of the fortune I inherited into this observatory in Arizona. I should rather have stayed in England, but the climatic conditions were not good enough. So, I came here, and here I have been for the last thirty years. I have been spending the income from the other half of my fortune and a fair part of the principal in trying to prove my one thesis, namely, *that there is life on other worlds than ours.*"

"And you've been here all of thirty years?"

"Not quite that. Now and then I go down to Flagstaff and less often I attend some scientific meeting and read a paper on my findings, but I suppose that ninety-nine per cent of the time I've been right at this eyepiece."

"I envy you, Percy. I've been only to Australia and Gobi and two years in Greenland and some more in Central Africa, but you've been, at least so far as your sight is concerned, to the furthermost parts of the universe."

Percy Whitland sighed and closed his eyes as he murmured:

"Not the furthermost parts, Harry; I have seen just a corner of space. Our cosmos is so vast that what the highest-powered telescope can see is only an infinitesimal part of the whole."

"MY word! I can't even imagine distances so great. Listen, lad! I've made a long trip to talk to you about things out there"—and he waved his hand toward the star-studded dome—"but perhaps I've come to the wrong man. Perhaps you'll just laugh at me?"

"I would never laugh at you, Harry," said the little man, gently.

"But you know so much more than I do!"

"And you know lots that I don't. Why not speak up? The night is yours."

"All right. But first, a few questions. Do you really think that anywhere out there, there is organic life of any kind?"

"Ah! I wish I could answer that! Do you recall Giordano Bruno? He was a man! He had the courage in 1600 to say that he believed there were other worlds than ours, each with some form of life on it. They tried to make him retract, but he held fast, and they burned him at the stake. They put poor old Galileo in prison for daring to say that the earth moved around the sun, and at last, unable to stand the tortures of solitude any longer, he made a public retraction. However, even as he knelt and acknowledged the error of his former statement, he murmured under his breath, "*and yet it does move.*" These were sorry days for astronomers! Times are better now, but even in the last thirty years I've been sneered at when I've publicly made the statement that there was scientific proof of life on Mars and laughed at as an utter fool when I suggested that parts of Venus could be inhabited by human beings."

"But do you think so? Truly?"

"Yes, of course! But the idea that every little planet is a possible home of living structures is not accepted by the rank and file of modern astronomers. We do know what the surface temperatures of most of our solar planets are, which is one of the most im-

IN this marvelous sequel to "The Conquerors," Dr. Keller carries on the further efforts of Sir Harry Brunton to save the human race from destruction. Dr. Keller has used the latest developments of science in his own imaginative way to prove to us that life can exist on other planets, such as Venus.

It is true that, to our knowledge, the conditions on Venus, our nearest neighbor, are not generally favorable to the presence of life such as ours, but the phenomenon of oscillation, mentioned by Dr. Keller, is one that deserves most serious consideration. It is obvious that life such as ours demands a condition in which the temperature does not vary over a great range; a maximum of 120 degrees Fahrenheit and a minimum of—50 degrees Fahrenheit, are in general, the outer limits of the temperature range possible for the existence of human life.

That such conditions might exist on Venus, Dr. Keller affirms and brings forward a great deal of scientific proof.

"The Evening Star" in our opinion, has all the basis and structure of a model science fiction story.

portant factors.

"When I talk about our planets I feel at home. I'm among neighbors, old friends. Good old Neptune and Mercury are just like near-by towns. I can study the canals on Mars and do all kinds of dreaming about Venus. And yet, when I seriously approach the question as to whether there is life on our nearest neighbors, I waver between desire and hard facts. It is so hot on the surface of Mercury that liquids boil there, while it is so cold on Neptune that everything is frozen hard. Adams and St. John believe that the atmosphere around Mars contains only fifteen per cent of the oxygen that the earthly atmosphere contains. Venus has probably one per cent. The question is: Can life exist under such conditions?"

"But what do you think?"

"As an astronomer, I think it doubtful. As a man, I hope that Mars and also Venus hold beings comparable in some respects to us. I have tried for thirty years to prove that this is so. Now, just between us two, I'm going to say *that I do not know.*"

"How would you like to make sure?"

"How could I do that?"

"By going to Venus!"

A Little Chat

"EXCUSE me for a few minutes," exclaimed the astronomer, suddenly galvanized into a tornado of action. For long minutes he worked with his telescope; then he motioned to Sir Harry to take his place at the eyepiece. The anthropologist saw a bright silver crescent that seemed to be enveloped in a white mist.

"How near is it?" whispered the astronomer.

"Near? My word! I could hit it with a rifle bullet."

"Think so? That's Venus. It is getting as close to the earth as it ever does, and that means that when it comes to inferior conjunction* it will be 26,000,000 miles away from us. That isn't far, of course, as stellar distances go, but, at the same time, it is a tidy little stretch. I understand that men ultimately expect to travel through the air at the rate of six hundred miles an hour. Going that fast, it would take 1805 days or 5½ years of constant traveling to arrive at Venus. Yet you say it seems so near that you could hit it with a rifle bullet."

"And that is our nearest neighbor?"

"Yes, excepting the moon, and Eros, a planetoid which occasionally gets within 14,000,000 miles of us."

"Do you suppose mankind will ever be able to conquer the problems of that space, just as they have gone down under the ocean in submarines and into the air in planes?"

"You come to my rooms, Harry. I can answer that question better there. I'll turn the work of the night over to one of my assistants. They thrive on responsiblity. My, but it is good to see you!"

Slowly he led the way out of the room which housed the enormous telescope. Walking, he measured barely four and a half feet in height. By nature a small person, he had been deformed by tuberculosis of the spine in childhood. He was a hunchback. Brunton was shocked to see how he limped, what ravages time had brought to that harassed body. The anthropologist, over six feet tall and in glorious health for his age, seemed by comparison to belong to a race of supermen.

PERCY WHITLAND led the way down to the rooms under the observatory. For years these had constituted his only home. Here he had studied and dreamed and longed for something to happen that would enable him to prove to his own satisfaction his theory of the existence of life on other worlds. In this solitary building he had lived a life apart from the world, having as companions only a few young visionary fanatics who dared to share his dreams. In these rooms he had silently fought discouragement and disease. He was growing old now, but although he was still defeated he was undismayed. The more his body withered, the more bravely he used his eyes and his intellect in wresting from the Universe its many secrets. Yet all he had accomplished was as nothing compared with the mighty mysteries which lay unconquered and just beyond his grasp.

AS Sir Harry Brunton walked behind the shrunken body of his former college mate, he caught a glimpse of the struggle of all those years and the silent heroism that had made the conflict endurable; and he saw more plainly than ever that only the mind of man matters, only the soul has a life that is worth-while.

Whitland entered a large room and paused. It was a library, filled from the floor to ceiling with books of every size and description. A central table held more books. They overflowed the shelves and cluttered up the floor and the chairs. There were maps, magazines and folios. The little man turned on his guest with justifiable pride.

"Here is the finest private library on astronomy in the world. There are larger libraries in existence, but none are owned by a single person. Here I have most of the tomes, folios and manuscripts that were written about the heavens prior to the age of printing. I have the earliest printed books and the latest ones. I have all the astronomical magazines. I am the author of some of these books and of at least one atlas. Men come to this room from all over the world just to read pages that can be seen nowhere else. This is my mental workshop. Here I check and recheck the work of the previous night. For thirty years I have not spared myself. No slave ever worked harder than I have. And why? Because I feel that each night may bring with it the final clue, and that clue might be lost forever were I to allow myself a moment's relaxation, a night of pleasure, a dark hour of sleep. How can I tell when death will come?

"Suppose I found an answer to my questions at the end of another month? What if just a little more work would suffice? How terrible to think of death interrupting the labor of thirty years when I am just on the threshold of success, when I am passing from doubt to certainty! This is the thought that has driven me on.

"Not a cheerful thought, you'll say. Perhaps not, but it's one that I've never been able to shake off. Well, you're enough of a scientist to appreciate the value of such a collection of books. Even here in Arizona I had heard of your remarkable researches in anthropology. Suppose we go into the next room."

"My word!" exclaimed Sir Harry, as he passed through the doorway. "You don't mean to tell me that you have still another roomful of books?"

"Yes, but of an entirely different nature. In the first room there was nothing but cold science. Some of it has been shown to be false, but the men who wrote did the best they could. Roger Bacon, Galileo, Pythagoras, Bruno, Nicolaus Copernicus and many others did noble work, even though their conclusions have since been proven incorrect. But in this second room I have eliminated science and filled its shelves solely with the fantastic dreams, the stupendous hopes of men, who, never satisfied with what they had dreamed might happen, had placed their visions on paper. Here are interplanetary tales dealing with other

* Inferior conjunction in this case occurs when Venus is between the earth and sun.

worlds than ours and with life on these planets of every possible shape, size, color and deadliness. I have a standing order with booksellers all over the world to send me lists of all such novels or short stories. I have everything by Verne, Wells, Servies, Gernsback and Otto Willi Gail. As well as a host of other writers about the unknown.

"AND I not only buy these books, but I read them all! Some are good and some are poor, but they are all representative of a great truth. Underneath the dire hopelessness of it, behind the impossibility, the futility of it, lies this fact, that mankind feels that perhaps someday *interplanetary travel may become possible!* There is always that hope. Of all the types of science fiction, this type is the most popular; the reading public demands it. Less than twenty-five years ago men were laughing at Verne and Wells. Now they are reading about rocket-plane mail carriers and are calmly discussing a flight to the moon. And here's another interesting point. In all these travels to distant stars, the adventurers from the earth always find life—monstrous in some respects, but with the same mental reactions as human beings. Who would want to read a story of travel to a distant planet unless life were discovered there?

"So, there is the hope! The tired business man, the clerk and the scientist who buy the thrillers on the news stands, all want to read about such adventures, because they want to think that these may someday become actual facts. That is the universal hope of the race. We have conquered the water and the air, and now we want to explore the unlimited space that surrounds our earth.

"And that hope is my hope. I have approached it from the standpoint of pure science, but when I am tired, exhausted with my mathematical problems, I turn to these books and anaesthetize myself in their fancies."

"So! You really feel, even though you can't prove it, that life may exist somewhere else?" Sir Harry asked sympathetically.

"Yes, though it may not be life as we understand it. It may be animal, vegetable or mineral.

"Or we can look at it from another viewpoint, the old one of vibrations. We know that the human ear is receptive to only certain sound vibrations; the human eye sees only a part of what there is to be seen, and so on. Suppose a race existed on some other planet with such a rate of vibration that neither the human eye nor the ear could perceive them, yet in some way they were able to make themselves known to us?

"These and dozens of similar hypotheses have disturbed my waking moments and filled my dreams for years."

"And all these questions could be answered if explorers were able to conquer space?"

"Certainly!"

"Do you think that sometime men will learn to do it?"

"Yes. At the rate they are advancing now, no one can tell what will happen a thousand, five thousand years from now."

"My word, Percy, but that's a long time! We shall be dead then."

"We certainly shall. Dead and forgotten."

"Yet you think the proof of other life can only be furnished by the actual journey to other worlds?"

"It seems so. Of course, the radio enthusiasts think that they could radio to Mars if only an interplanetary code could be devised. Some have fancied that they have sent a radio wave to the moon and detected the rebound, or echo. It has always seemed to me that if there were beings alive on our planets, they would be trying as hard to communicate with us, as we are with them, and that some day something ought to be accomplished. But, when everything is said and done and the last piece of argument has been stilled, the fact that remains is simply this: *No one can tell whether or not such life exists without going there to make actual observations.*"

The anthropologist drew his pipe from his pocket and started to fill it.

"Let's go somewhere where we can be comfortable and talk a little. I have something to say to you."

"Certainly. I have a room that has nothing in it except a fireplace, two easy chairs and the greatest puzzle in the world."

"That sounds interesting."

Once in the room, Sir Harry Brunton looked around him. On a marble pedestal, near one wall he saw a replica of the Venus de Milo.

"My word! You're right, Percy. Woman is a puzzle that no man has ever solved. You must meet Charlotte. My word! She loves me devotedly, and yet, at times, she makes me feel like wilted lettuce."

CHAPTER II

The Conquerors

WHITLAND climbed into one of the great overstuffed armchairs and carefully adjusted his crooked spine to one of the hollows of the upholstery.

"I presume," he purred, "that Charlotte is a woman?"

"She's more than that. She's my wife; at least, she would be if we could ever spend a few minutes in company with a preacher."

"You don't mean that you're just living together?"

"Not exactly, but—well, it's a long story. For the last year Charlotte and I have been living a most unusual life amid most unusual surroundings and with a very odd sort of people. In other words, we've spent a year with the Conquerors."

"That doesn't mean much to me."

"Perhaps not. No doubt you are so interested in your stars that you forget to read the newspapers. The Conquerors are a race of dwarfs who claim that intellectually they are at least eighty thousand years in advance of the average human being. They drove the inhabitants out of five American states, and so far as I have been able to find out the people have never gone back. The British Government asked me to investigate the trouble and I did. My word! I went to the base of the Conquerors and became one of them. It was an experience. Touch and go most of the time, but I rendered them a service and obtained a promise from them that they would not destroy the human race, at least not right away. Some of our party were liberated, but I decided to remain there as a hostage, and at the last moment Charlotte decided to stay with me.

"All things considered, it has been a remarkable experience, especially the part connected with Charlotte. Poor little girl! In love with me and yet refusing to marry me unless I supplied a preacher, and, at the same time, refusing to leave me.

"You'll understand all this better when you meet her. But she is just one of my problems. These dwarfs had decided to wipe out our race. They had discovered the bacillus of a new disease and were going to sow this in profusion over the earth from their airplanes. I was fortunate enough to play a good poker game with them and they reversed their program. They have something else on their mind, now, and until that is accomplished, they are going to let our race live on."

"Are you telling me the truth or just making up a science-fiction tale?"

"I don't blame you for thinking it's just another story, Percy, but it's all true, just as I have told it to you. That's why I'm here. These Conquerors are almost ready to send an expedition into space on a journey of exploration, and their first objective is Venus. They found out that you were an authority on astronomy. Of course, their idea is that we Middle Men, as they call us, are very far behind them in all scientific knowledge except astronomy. They have lived beneath the surface of the earth for so long that they have really neglected the study of the heavens. So they wanted an authority. At first they were going to kidnap you, but when I learned of it and realised that the man they wanted was the Percy Whitland I went to college with, I entered into the discussion.

"I told them point blank that it wouldn't do them any good to kidnap you, that you would die rather than be driven. Then I suggested that they invite you to go with them, and offered to carry their invitation to you. At first they were suspicious, but when I showed them that they had in Charlotte the finest kind of hostage to insure my return, they consented to let me make the trip. Of course, it was hard on Charlotte to stay there at Reelfoot Cave all by herself, but she's a true sport. So, there's the invitation. Will you join our expedition to Venus?"

THE astronomer slowly dropped from the chair to the floor and walked over to his friend. He put one hand on Sir Harry's knee and with the other seized the Englishman's right hand in a convulsive grip.

"You're not teasing me, are you, Harry?" the little man pleaded. "You aren't just making fun of me, are you? Why, I would sell my soul for a chance to make a trip like that! Even if I died before I returned, what a wonderful end I would have, knowing that at last I had solved some of the questions that have been a nightmare to me for over thirty years! You say these people are actually going to Venus? And want me to go along with them? Listen to me. I know something about Venus that I have not even dared to speak of to my pupils. There are some things that perhaps even those wise men you have lived with don't know. I shall be glad to share my knowledge with them if only they'll let me go with them— Oh! Pshaw! The bubble of my dream has broken! I thought for a while that perhaps such a trip was possible—but of course, you are fooling!"

And the little astronomer, this man with the brains of a giant and the body of a diseased child, threw himself on the lap of the giant in front of him and began to sob.

"Don't do that, Percy!" begged the anthropologist. "Why, you make me feel worse than Charlotte does sometimes. *It is all true.* Of course, they haven't actually tried out their space machine yet, but I think it will work. It ought to work. They have been over a hundred years in designing it. They really are very brilliant, and they want you to go with them. And I am going too, Percy, to take care of you and Charlotte, and see that nothing happens to you. You just forget everything except that you're going to have an experience no other earthling has had. How soon can you get ready?"

"Very soon. It won't take long to select a few books."

"How about clothes?"

"Won't those I have on do?" replied the happy man.

About Some Civilizations

"THE airplane," explained Sir Harry, "is somewhere up there in the darkness. It is noiseless in its flight and absolutely under the control of its pilot. All he has to do is to press a button now and then and the electrical robot does all the rest. If I had success in my request to you, I was to be here at 2 a. m. and flash a signal three times from my flash light. They will come down to the ground at any point we wish."

The two men were about a mile from the observatory. For over half an hour, most of which had been spent in silence, they had waited on the sands of the Arizona desert. For Percy Whitland it was the period before the curtain rose on the most stupendous drama of his life, but to the English anthropologist it was just the beginning of one day more. For the last fourteen months he had not only seen strange dramas, but had been one of the leading actors in them. Now he had only two dominant desires—to save his race, the people whom he was fond of calling human beings, and, second, to make Charlotte happy.

After that, if time and opportunity should permit, he wanted to spend months in studying the colonies of people saved from the wrecks of previous civilizations. For eighty thousand years the Conquerors had been destroying entire nations, but now and then they had saved a small portion and allowed them to continue working out their destiny in splendid isolation. These remnants formed underground Anthropological Gardens, comparable to the finest Zoological Gardens in the world, and for thousands of years they had been so perfectly concealed that their existence was unsuspected by modern man. The Englishman longed to visit some of the underground caverns of the Conquerors. He wanted to see how the Dawn-men were living, what progress the Phoenicians were making and whether the Colony from Atlantis had preserved any records of the titanic disaster that had wiped out one of the continents of the earth and buried it under a deluge of green water and drifting weeds of the Sargasso Sea.

All these thoughts came to him as he and his friend paced the sands, waiting for two o'clock to come. He longed to do all this, he wanted, in some way, to make Charlotte happy, but above everything else he yearned to save his people from an overwhelming and universal disaster.

Suddenly he took out his flashlight, pointed it toward the heavens and flashed it on and off three times. He waited a few seconds, turned the light on and stuck it in the sands. They did not have to wait long now. Silently and without warning, something loomed above them, a soft light appeared and the bulk of a plane landed noiselessly. Small voices greeted Sir Harry, a hasty conference was held, and then the little astronomer was assisted up the steps into the plane. Sir Harry followed him and the door was shut. All lights were turned off and conversation ceased.

PERCY WHITLAND remained silent as long as he could and then he asked:

"How soon are we going to start, Harry?"

"We have started; we are well on our way back to the place I call home."

"But there's no noise, no vibration. I've never been in the air, but those machines that have passed over my observatory always made a lot of noise."

"Those machines, Percy, are just children's toys compared to this one. These people have a new source of power. It is so perfectly under control that they have practically eliminated all the annoying complications that the people of our race have to put up with when using any form of motor machinery. I'm not an engineer, so I can't understand all of their inventions, though they have frequently tried to tell me about them. But it seems that their power is obtained from the perfect smashing up of the atom."

Percy Whitland rubbed his hands excitedly together.

"I know something about that!" he whispered eagerly.

"Fine! Perhaps that was one of the reasons why they

wanted you to go with us. This old bus runs rather smoothly, doesn't it? In reality we are going nearly five hundred miles an hour and I understand their planes are capable of much higher speeds. Just how fast are we going?"

He addressed the question to a large-headed dwarf who was seated in front of them. After a slight delay this strange-looking man, who was acting as pilot, replied:

"Four hundred and fifty miles at the present time, Sir Harry. We should arrive at Reelfoot at daybreak."

"That man is sitting there with folded hands, Harry."

"Certainly. My word! What else is there for him to do? The gyroscopic control of the machine keeps it at the proper altitude, the power flow is absolutely automatic and before the trip was started a radio beam was established between the Crater at Reelfoot and your observatory. All that this man had to do was to place the car in the path of the ray for the return journey and turn on the power. He regulates the speed and, to be sure, he can change his course if he wants to, but when the exact destination is known before hand, they have found that it is much better to have the plane guided by a selective radio beam. I understand our race is able to do something like that for a short distance, ten or fifteen miles, to make flying in fog safe. The only difference is that these people are able to go around the world on such a beam if they want to. Usually, however, they prefer their tunnel cars."

Charlotte

"WHAT do you mean by tunnel cars?"

"It's like this. These people live in caves and enormous craters. These places are connected by tunnels very much like the Holland Tube in New York. They travel through these tunnels or tubes in long cylindrical cars which are very nearly as large in diameter as the tunnels they dash through. They use the same motor power in these cars that they do in their airplanes, and I believe they are going to use something like that power in their space machines."

"You've been living with them for over a year? What a wonderful time you must have had!"

"I suppose so. Just like living on the verge of an explosion all the time; and then there was Charlotte."

"Yes. I had forgotten her. That seems the strangest part to me. All the years I knew you at college you never even spoke to a woman. We thought you were a real woman-hater."

"Well, you see— My word! It's hard to explain; but Miss Charlotte Carter is not like other women I have meet."

"Evidently not."

"No. She's different. I didn't want her to stay. I saw that there would be difficulties. No other woman there. No company for her except me, and I had to be away from her a lot. You see, I'm the Official Consultant to the nation."

"Official Consultant?"

"Yes. They have about two hundred Specialists, three Co-ordinators and a Dictator, called The Directing Intelligence. Yet they wanted one of our race as a sort of general advisor, and selected me for the position. I had two New Yorkers with me at first but I was able to secure their release."

"It all seems like a fantastic Alice in Wonderland tale to me. If it were not for this plane, I should still think I was dreaming."

"That's because you are a hermit, an isolated scientist. You're like a man I once heard of, who awoke in the morning and saw a pair of arms on the top of his bed. He called his wife and asked her whose arms they were. She said they were his arms. He started to move them around. At last he told her that she was right, but he was not sure till he found that they were attached to him and that he could use them. My word! Seems to me you ought to believe me."

"I believe you, Harry, just as much as I can."

JUST then dawn came and with it Reelfoot Lake and the Crater. Gentle in its flight as a falling feather, the air machine settled on the edge of the precipice. The anthropologist opened the door, stepped out, assisted the astronomer, thanked the pilot and led the way to the apartment where Miss Charlotte Carter awaited them.

"No use telling the Co-ordinators that I succeeded in bringing you back with me," explained Sir Harry. "They have radio-television that enables them to follow a man very accurately at a distance and not only see him but hear his words. Allow me to introduce my fellow anthropologist, Miss Charlotte Carter, lately of Virginia."

Whitland bowed and gently took the lady's hand.

"I'm proud to meet you. Harry and I went through Oxford together and, though we haven't seen each other much since then, we've never lost our love for each other. I'm glad he found you."

"That was nicely said," answered the white-haired lady. "Of course, he's told you about my being here. He wanted me to go when the others left, but I just couldn't bear to leave him alone among strangers for the rest of his life— So I stayed. We are to be married as soon as we find a preacher."

"And in the meantime she helps me forget my worries, Percy," chimed in Sir Harry. "Come, let's have some breakfast."

He pushed a button on the wall; a hitherto unseen door opened and a table, set for three, rolled into the room. Miss Carter made a charming hostess and, in spite of the unusual surroundings and strange food, the visitor ate heartily.

"I think you'd better rest now, Percy," suggested the Englishman. "You've had rather an exciting night; you're not very strong and you'll feel better for a little sleep. I'm going to show you to your room and we'll have dinner when you awake. Best not think about all this. Just rest and forget everything except your happiness in the prospect of accomplishing your great desire."

The big man did not leave his friend till he had seen him safely tucked away under the covers of a bed. Then Brunton started to leave the room; Whitland called him back.

"I think Miss Carter is very lovely, Harry. You ought to be congratulated—on your fellow anthropologist."

Sir Harry patted the little man on the shoulder.

"That's splendid, Percy, I'm glad you like her. We're going to be so happy to have you with us, old chap."

When he left the room this time Whitland fell asleep.

CHAPTER III

A Peculiar Man

SIR HARRY found one of the Co-ordinators waiting for him in the living room of the apartment.

"It is well to note, Sir Harry," the dwarf said soberly, "that it all turned out just as you said. We were confident that you would come back, but we were not at all sure that the astronomer would return with you willingly."

"He was more than willing. Let me tell you something," Brunton nodded confidentially. "He is a very brilliantly educated man; in fact, I think he is far ahead of any astronomer in my race. Of course, I can't tell how his mind compares with the mind of your Specialist in Astronomy, but it is my opinion that he will make a valuable addition to the scientific group who are working out the details

of our trip to Venus."

"What does he think of the possibility of life on that planet?"

"He considers that it can only be proven by actually going there. At the same time, he feels that there is as much chance of our finding life as of not finding it."

"What does he think of the complete disintegration of the atom?"

"Frankly, I don't know. But he intimated that he knew a great deal about the atom."

"He is certainly a very peculiar man. Did you notice anything remarkable about his body?"

"No. He just looks a little weaker and a good deal older than he was when I knew him back in college."

"I see. He always has been the way he is now," the dwarf reflected. "Some of our specialists have had a peculiar idea about him. That will be developed later on. The Directing Intelligence will arrive tomorrow for a conference and then we will start the final preparations for the trip. Have you anything to do this evening?"

"Not a thing."

"Then a few of us will stop in for a game of poker. Since you gave us that treatment and started to teach us the game, some of us have given it a good deal of thought. You recall that you said one of the greatest factors in the previous decline of our national psychic ability was the fact that we had ceased to play."

"Well, you ought to make fine card players. You have what the Americans call perfect poker faces."

"Explain just what you mean by that."

"It means that you must never indicate by your faces what your feelings are, if any. In fact, having no feelings, you betray no elation or despair. No matter if you knew from the very first that your opponents could defeat you, you would never show it by any emotional change in your face."

"I understand now. It is something that we can't help. We three Co-ordinators will drop in tonight. Do you suppose the astronomer plays?"

"My word! How should I know?"

"You will find out. I'll bring some of our old gold pieces around for chips."

It was late in the afternoon before Whitland awoke. He found his friend reading by his bedside. It seemed hard for the little man to orient himself.

"Is that you, Harry? Where are we?" he asked.

"How odd! Don't you remember? At present you're in my private apartment in the Reelfoot Crater, one of the principal bases of the Conquerors. You came with me last night from Arizona, because I told you that you could go with us to Venus."

"That's right. I recall now. And it must all be true. What a peculiar light!"

"It certainly is. These fellows have certainly solved the problem of illumination. It comes from a cold heat and their specialists say that it has no harmful effect on the retina. Better take a tub and dress. Our friends have asked that you wear the costume of a Specialist. It may seem odd at first, but I can see some advantage to it. Then we'll have dinner and later on some of them are going to drop in for a game of poker. Do you play?"

"Never have."

"Imagine that, when you could have used the stars for chips in a game with a fellow sky-gazer. I'll bet you can learn."

"I hope so."

A Revelation

DURING the past year the Directing Intelligence, the three Co-ordinators and Sir Harry had held many a conference. Sir Harry was asked his opinion on every subject under discussion and, while his advice was often disregarded, it was weighed soberly enough to make him feel that he was considered a valuable member of the nation of Conquerors.

The morning after the poker game another conference was held, but at this one the guest from Arizona was present. As usual, the Directing Intelligence lost no time in starting the conversation.

"You may think it odd, Mr. Whitland, that we asked you to come here to assist us in our interplanetary journey. You may feel that we are strangers to you. In reality, we have been in very close touch with you and your work for a good many years."

"I'm surprised to hear that."

"You won't be when I finish. Long ago we had some fairly fine telescopes and did all our own astronomical work. But we realized many centuries ago that in order to investigate the stars properly we had to have telescopes of great size, and these had to be in clear open places free from dust, mist and vapors. We could not make and use such telescopes ourselves, because of our desire to remain unknown. We were not yet ready to announce our existence to the Middle Men. So we started to experiment. We sent agents out to the surface.

"One of them helped Piazzi on his career, so that he discovered Ceres in 1801. Previously, in 1781, with a telescope that we indirectly paid for, Sir William Herschel had discovered Uranus. We were directly interested in the work of Professor Adams of Cambridge and that of the Frenchman, Leverrier.

"When you were still a boy our attention was called to you in many ways. We helped you through your University, and in the year of your graduation made you a rich man. Perhaps you were always doubtful as to how the uncle who left you his fortune had acquired his wealth. You can guess now. We wanted you to discover the truth of certain unanswered questions which we felt were vital to the success of our undertaking. The exploration of the skies year after year was necessary for this. You did that for us as we knew you would. Our psychic life was at a low ebb by that time. We lacked initiative. But Sir Harry, by his discovery of the specific hormones that our bodies lacked, has restored us to our former mental alertness For that, we are indebted to him.

"So thirty years ago, when you started to devote your life to astronomy, we felt you were working for us, as your special hobby was Venus, the 'evening star.' That planet is the objective point of our first space journey. We wanted you to go with us, for many reasons, but before we started we felt the need of your investigation of the whole problem of interplanetary forces. There were other questions we wanted your advice on, too."

"May I ask a question?" said Whitland.

"Yes." The Directing Intelligence nodded his head in a regal manner.

"Why do you wish to go to Venus?"

"There are several reasons," the dwarf answered. "The first is biological. As you probably do not know, we are an emotionless race. We were made so partly by our conscious stifling of all emotions and partly by climatic forces. We discovered that the action of the sun's rays was responsible for most of the emotions. That is why your southern races are so noticeably unstable emotionally, while northerners are more calm and in control of themselves.

"For this reason we moved into caverns and away from the rays of the sun, many, many thousands of years ago. Now that we wish to expand our nation it becomes necessary to come out to the surface. The earth is still too much

exposed to the sun's rays. But Venus, we know, is well protected by its great layers of clouds. If therefore, our expedition is a success, and the conditions on Venus are favorable, the whole nation will be removed."

"You honor me in offering me a part in this," was Whitland's modest answer.

"NOT at all. In the first place, the word honor is practically unknown to us. Now there is one part of your life that is more than of interest to us. In fact, it is one of our greatest reasons for determining to destroy the Middle Men as soon as we return from Venus. They would have been destroyed ere now had it not been for Sir Harry Brunton. I suppose you understand what ataviam is?"

"Not entirely. You see, that deals with biology, and I have not thought much about that science during the last thirty years."

"I'll explain it to you, then. Occasionally an individual is born with the physical or mental traits common to a species that existed ten thousand or a hundred thousand years ago. Examples are the Darwinian tubercle on the ear, unusual remnants of hair on the body, peculiarly shaped teeth, webbed fingers, persistence of ancient sounds in infantile speech, cervical ribs and a hundred other anomalies, showing evidences of the pit from which mankind has slowly climbed to its present height.

"We all realise that there is such a thing as ataviam, and it has never worried us, because we understand it. But suppose we take the exact opposite. What would be the result if, in every generation, there were ten individuals born who were physically and mentally ten thousand, fifty thousand years ahead of their times? What would happen if these ten found each other and organised for the defense of their race against us? Of course, if we were fortunate, we could identify all these individuals and block them in some way, even kill them. But suppose they became too clever for us! We went into every phase of this danger, and at last decided that it was so important that the only safe plan was to destroy the source by blotting out your race."

"This is very interesting to me," interrupted Sir Harry. "As an anthropologist I am well acquainted with the problem of ataviam. That is simply the result of inheriting traits from remote ancestors rather than recent ones. But how can an individual inherit traits from generations yet unborn?"

"You have a perfect right to say that the future generations are as yet unborn, but that does not mean that they don't exist. We believe that the future does exist, but in a different time dimension. It is true that no two bodies can occupy the same space at the same time, but perhaps two bodies could occupy the same space at different times. That is as far as I can go just now in the explanation, but we have certain examples of life that make us feel that, when a child is formed, there is possibly a fusion of the child of 1931 and the child of 9931. As there would be only one body the result would not be like the average human being of either age, but the intelligence would be far above that of the ordinary Middle Man of what you call the human race. Now, I am going to ask Mr. Whitland a question or two. Have you ever found any physicians who explained, to your satisfaction, why that ego of yours that you Middle Men call soul is occupying a body so unlike Sir Harry's and so much like mine?"

"NO, not to my satisfaction. Most of them said that it was the result of tuberculosis, others spoke of intrauterine rickets, and still others mentioned dysfunction of the glands of internal secretion. I have not seen a doctor for thirty years. I lost faith in them and stayed away."

"Were your parents normal and healthy persons?"

"I never knew. They died when I was young."

"Have you felt a close relationship with the men and women of your generation?"

"I never had a real friend except Sir Harry Brunton. I always felt shy on account of my deformity and my difference of intellectual interests. Others thought that my intense specialisation was rather queer."

"Have you ever had an operation or accident in which you lost blood? Was your blood ever examined?"

"Yes. While I was at Oxford a pathologist examined my blood and said that I had a great excess of white corpuscles. He thought that a fatal condition; but I am still alive."

"You, of course, have no objection if we examine your blood?"

"Not at all."

"Very well. We will send for our Specialist in Pathology."

This Specialist must have been previously summoned, for he entered the room at once. The Directing Intelligence ordered him to make an examination of the blood of the astronomer.

A lancet was plunged into the ear lobe, and glass slides and pipettes prepared to receive it. The Conquerors gathered around the man from Arizona. Even Sir Harry peeped over their heads.

The blood flowed white from the wounded ear.

"The ichor of the Gods!" said the Directing Intelligence without emotion. "We were right. Mr. Whitland is not a Middle Man. He does not belong to the human race of 1930. On the contrary, he is one of our nation, being undoubtedly the descendant of one of our agents, these having from time to time intermarried with women of the Middle Men. He is what you call a Conqueror."

With His Own People

WHITLAND swayed a little and might have fallen, had not Sir Harry caught him. Then he recovered himself and smiled.

"That is good news. Instead of being with strangers, I am wonderfully blessed by being among my own people. I may have been born fifty thousand years too soon, but you have made it possible for me to leap across the centuries and spend my last years with those of my same generation. It makes me more anxious than ever to help you in any way I can."

"We will have another consultation tomorrow," concluded the Directing Intelligence, nodding. "It is well that we have you here—as one of us. Had you recognised your power it might have been necessary to blot out your existence in some way. As you are a member of our nation, we want you to live as long as you are useful to us. Still, the very fact that you have proved to us, by your blood and intelligence, that reverse ataviam is possible, makes me more determined than ever to destroy the present race of Middle Men, saving only about two hundred who are to form the New York Colony."

"And I have always said," added Sir Harry, "that a civilisation that cannot defend itself against any danger is no longer worthy of existence. I can say that because I, also, am a Conqueror. Of course, I have asked that their destruction be postponed till we return from Venus. But though the debacle is postponed, it is inevitable."

The four Conquerors and the two Middle Men stood up as the conference adjourned. The Englishman, looking at the five small men, was astonished to find, now that there was an opportunity for comparison, how very similar Percy Whitland was to the members of that strange race. There was a difference; his head was not quite so large, his hands

were smaller and his lower limbs more sturdy. The forehead was less prominent, the lower jaw more developed; yet the general resemblance was marked.

The two college chums returned to the Brunton apartment where Miss Carter was waiting for them.

"Did anything new happen?" she asked.

"My word, yes!" her lover replied. "They have been investigating Percy and think he is a case of reversed ataviem or something like that. They have examined his blood and claim that he has the same ichor in his veins that they have. They claimed him as a brother at once and made no end of fuss over him. At the same time they are determined to kill the rest of our race—when we come back from our space trip."

"I don't think Mr. Whitland is at all like them. It is horrid in them to even think so."

"Well, it doesn't make any difference. I am glad that he's here with us. He's going to be a big help in many ways. He may have ichor in his veins, but he has a heart in him that is as big as all out doors."

CHAPTER IV

The Space Machine

"We are showing you this machine and explaining it to you so you can point out its weaknesses to us, if there are any," explained the Specialist in Aviation. "We feel that we have taken into consideration every possible factor, but we want to make certain."

The party of Specialists, with Percy Whitland and Sir Harry, were standing alongside of the space machine, constructed to carry a goodly load of the nation of Conquerors on their journey of exploration. It was a cigar-shaped aircraft, nearly six hundred feet long and a hundred and fifty feet high. The bottom rested on a long slanting earth groove, the machine rising into the air at an angle of 45 degrees. The surface was of metal, so highly polished that it was hard to tell where the metal body and the thick glass windows joined. The party took an elevator and descended to the bottom of the hole, where the rear end of the new machine lay comfortable and safe on pneumatic cushions, reinforced with powerful spiral springs. At the very end four openings showed jet black against the clearness of the polished metal. Fifty feet from the end there were other black openings arranged like beads around the circumference, at equal distances from each other.

"This is a perfectly constructed rocket ship," explained the Specialist responsible for the ship's construction. "The forward motion depends on the four rear tubes; the steering is done by making use of selective combinations of the other tubes further front. The ship itself is made of three layers of beryllium, between which are almost perfect vacuums. The beryllium weighs one-third of an equal volume of aluminum. We have solved to our satisfaction most of the problems which, so far, have kept us on this earth. We feel that, once we ascend beyond the atmosphere of the earth, we shall have no trouble in going through space, at a speed thus far considered impossible. The first problem is to overcome the gravitation of the earth. I wish you would give us your figures on that to see if ours harmonize."

"Well," replied Whitland. "To be on the safe side, I think that your space ship ought to leave the earth at a speed of six miles a second. That would be nearly 350 miles the first minute and by that time the ship would be well outside the earth's atmosphere. Of course, it would have to keep on going; otherwise it would be captured and become a satellite like the moon. Once your car is sufficiently beyond the heavy gravitational pull of the earth, it can attain quite a respectable speed and keep on going until it gets within the gravitational influence of Venus. Your ship will be moving in space that is relatively empty. It has always been my idea that a properly propelled ship could be made to travel with the same speed that our earth does about the sun, approximately 18½ miles a second, or about 1,000 times the speed of the fastest express train. Of course, such a speed can only be obtained in space where there is no atmosphere."

"You agree with us then that space is relatively empty?"

"Absolutely."

"Then we are not apt to be impeded by friction. What other dangers are there?"

"How about your supply of oxygen?" Whitland asked.

"That has been arranged for. We will make it as we need it, and we can remove the carbonic acid gas. Our food supply is also going to be adequate."

"Is your ship so tight that it will hold its air when it is in the almost perfect vacuum of space?"

"Yes."

"Well, of course, there is the great danger from meteors, but mathematically your chances of avoiding them are very good. What have you done to slide into the atmosphere of Venus so slowly that you won't heat the ship to such a temperature that life within it will be destroyed?"

"A very good question. Just as soon as we approach the atmosphere of Venus, we will turn off all our power except just enough to guide the ship, so that we will enter the atmosphere in a slanting direction. Then we will start some shots from the rockets on the front of the ship, and these will act like a brake. Our mathematicians have calculated that we shall be able to take our time descending to the Venusian surface, once we enter her atmosphere."

"Then all that remains is to determine whether your source of power is adequate for the trip."

"That's all. You had an example of it in your air trip here from Arizona."

"I understand that you destroy the atom?"

"Completely. By means of an extraordinarily high voltage we are able to break down the atom and release its energy. Breaking down carbon, for example, gives us 18,000 million times the amount of energy we should obtain if we simply burned it as coal. This energy we use for our rocket explosion. It is being done all the time in the universe around us, in the suns and stars in space."

"Yes," agreed Percy Whitland slowly, "there is no doubt that the complete destruction of matter in space is responsible for the highly penetrating rays that are constantly battering the atmosphere of the earth. It is probably this force that keeps alive the sun and stars."

"Have you any suggestions to make, Mr. Whitland?"

"Not now. I shall have to think it over."

Just then a message came from the Directing Intelligence, stating that he intended to call on the astronomer that evening.

"You are becoming popular," commented Sir Harry. "A little more and I am going to become jealous of you. My word! It's Mr. Whitland here and Mr. Whitland there, and they seem to forget that I exist."

The little man laughed at him.

"Forget it, Harry. I'm just a new toy for them to play with. When they want action, they'll come to you. I'm not forgetting you. I have a surprise for you and Miss Carter that I'm going to spring on you some day."

The Objective Point

"I UNDERSTAND," said the Directing Intelligence that evening to Whitland, "that your ideas of conditions on

the planet Venus are different from those of most astronomers. Is that true?"

There was only one other at this conference, namely Sir Harry Brunton. For some reasons best known to himself the Directing Intelligence had thought it best not to have the three Co-ordinators present.

A Confession

THIS caused our friends from the earth's surface a considerable amount of surprise, for in all previous meetings the Directing Intelligence had always had his three Coordinators present. It seemed therefore to Sir Harry that there had been some changes in the relationship existing between the Directing Intelligence and his subordinates.

Sir Harry's comment on this strange event was to wink at Percy Whitland significantly.

"I suppose you are right when you say I differ from them," replied the astronomer from Arizona, "for I represent the hopeless minority. I think we all see the same things, but we differ in our interpretation. In the 17th century Bianchini, the Italian astronomer, made frequent observations and drew maps of what he claimed to have seen on Venus. The interesting thing about those maps was that the continents were of the same size and shape on both hemispheres, that is, on both sides of the planet. It remained for another Italian, Schiaparelli, to point the way to the great truth behind this similarity of the two maps. What the first Italian thought to be two hemispheres were in reality one. Venus' period of rotation on its own axis is the same, practically, as its period of revolution about the sun. This is comparable, then, to the movement of the earth about the moon and demonstrates that Venus always presents the same face to the sun as it circles around it during its year of 225 of our days. Schiaparelli watched the 'evening star' night after night and month after month, and found that the surface markings never changed.

"His conclusion was that there are two distinct portions to Venus, a dark half of intense cold and a light half of intense heat, at least sixty degrees hotter than it ever becomes on the Earth. On the basis of that discovery almost every astronomer in the world believes that life is impossible on Venus."

"And you?"

"Oh! I had to be different. That was my hobby. I felt that there *ought* to be life there; so I started out to prove it. But before I go on with my opinion, suppose I describe to you the geography of Venus as it is generally accepted by my co-workers. The hemisphere that faces the sun seems to be a desert, wind-swept and sun-baked. Dust storms of great velocity sweep over it, polishing its dirt floor till it becomes smooth as marble. Great crevasses extend in every direction where the heat-tortured surfaces have been torn apart by the thermal changes. Every drop of moisture is carried into the upper atmosphere by the heated winds. These blow high into the air and then roar to right and left, till they reach the dark edges of the other dismal hemisphere which never knows the piercing rays of the sun. Those moisture-laden winds, those water-bearing clouds, entering the land of perpetual darkness, condense and pour down their burden of moisture. First it descends as rain, but as soon as the darkness gathers into a more Stygian gloom, it becomes a blizzard, a snow such as no earthly eye has ever witnessed. These blizzards have been going on for thousands and hundreds of thousands of years. All of that dark side of Venus is covered with a perpetual mantle of snow over a layer of ice and it all rests under an eternity of desolate midnight. The cold wind, with all its moisture taken from it, curves around till once again it comes into the land of perpetual sunlight, where it picks up more water in the form of vapor from the heat-tortured [illegible]

"THAT is the way Venus would look if we could see all of her. One-half of it baking desert, the other half covered by glacial ice and heaps of everlasting snow. But around the south pole rise lofty mountains, whose peaks we can see projecting like warning fingers above the clouds of heated moisture. Those mountains must be over twenty miles high, perhaps higher."

"What a fascinating spectacle it would make to be out in the emptiness of space and with a powerful telescope to watch the eternal cycles of climate on that mysterious planet. Or to be an ageless observer, who has seen the evolution of the planet from time immemorial.

"One could have observed not only the evolution of Venus from the day she was flung off from the sun as a glowing mass of lava—but also the catastrophe—the collision between the sun and a visitor from space that brought all the planets into existance.

"It should make one feel a little humble when he compares his own little life span; his own little powers and intelligence with those mighty forces that have made our planets and cause them to speed ceaselessly around our sun."

Whitland seemed to be afire with the glowing enthusiasm about his subject. It was with a great effort that he suddenly remembered where he was and that he had wandered far from the subject of their discussion.

"We were talking about the violent contrasts of the climates on Venus," he said meekly.

"My word!" said Sir Harry. "And yet you think there is life there? Hot as hell on one side, and cold as hell frozen over on the other, and no place to go! Where could they live, those dwellers in Venus? What will happen to us if we ever arrive there?"

"Do you think that you really know enough about Venus from your observations to really predict what we might find there?"

"That is a very pertinent question," commented the Directing Intelligence. "You see it is unfortunately true that during the past fifty thousand years our environment has changed but little.

"It is therefore true that we have not developed resourcefulness to the same degree that you primitive Middle Men have. I am very much afraid that if we were to meet with very unusual conditions that we might not know how to cope with them. That is one of the chief reasons for taking you Middle Man along with us.

"I haven't finished," said Whitland, smiling at the hasty conclusion of his giant friend. "I started to study Venus from my observatory in Arizona, and my photographs showed peculiar markings on the planet which made it look like a wheel with dark lines as spokes, and those spokes never varied.

"From my observations I deduced that while Venus always presented the same face to the sun there was a slight shifting every four months in the position of a band or zone, due to the inclination of the axis of the planet.

Now whenever this oscillation occurs, a long strip of land extending from pole to pole and about one hundred miles wide is brought from its state of sunlessness into the sunlit area. It remains in the full glare of the sun's rays for four months and then slowly goes back into the shadowless night of the doomed land. The same has happened upon a similar area one hundred miles wide on the other side of the planet, which now turns its glaciers toward the sun, and four months later goes back again.

"Can't you imagine what happens? Venus is 30,000,000 miles nearer the sun than the Earth is. The temperature on the hot side is perhaps twice that of the Earth. Within a few days a strip of glaciers, enormous piles of ice and snow, are suddenly exposed to the intense heat of a tropical summer. Naturally the ice and snow melt, and a flood of water rushes headlong down in mighty rivers out to the torrid deserts of the Venusian hell. These rivers are perhaps five hundred miles wide as they leave their source in the melting snow mountains. As they rush over the baked mud, more and more of the water sinks into the hot dirt and the rivers become narrower. At last they are exposed to the full heat of the torrid sunlight and wither away into clouds of steam, which, carried to the atmospheric belt of the planet, once again turn into the snow and ice of the cold storage half of this peculiar world.

"There must be enormous clouds of steam-filled air, and I am sure that it is due to these clouds that we cannot see any of the surface distinctly except the lofty mountains around the south pole. We are told that Venus has an atmosphere but that it is so attenuated that life cannot exist there and that what atmosphere there is has no oxygen. I believe that this is not correct. Where there is so much water, there must be oxygen.

"If we look at the 'evening star' from this point of view, we see that one side is torrid and the other side more than frigid, but between these two extremes is a circular strip of land, several hundred miles wide and twenty thousand miles long, that is neither very hot nor very cold. If people lived there, they would always see the sun low in the sky, and have pleasant conditions with regard to both light and heat. There would be abundance of water for agriculture. It seems to me that there is everything there to allow a splendid civilization to develop. There is also another point to be considered. What effect has a covering blanket of moisture-laden clouds, fifteen or more miles in thickness, on the heat that pours down from the sun? Perhaps conditions there are more livable than we imagine."

"YOU present an excellent argument," said the Directing Intelligence. "Yet there must be a great many weaknesses in it, for, according to your own statement, not a single one of your astronomers agrees with you."

"I know that. But at the same time I believe I am more nearly right than they are. You see, my telescope, the one I was working with in Arizona, is practically the largest one in the world, with a four hundred inch mirror. Its size was made possible by the development of the use of fused quartz. I can obtain much sharper details on my photographic plates than others can. In fact, I obtain a picture of Venus entirely different from that of any other astronomer. But, after all, it is simply a matter of interpretation. For years we have worked and studied and plotted and tried to explain the canals of Mars, and now, Hopewell, the famous astronomer, says there are no canals —that they have not been able to withstand the acid test of photography. I showed him my pictures of Mars, and he simply shook his head and said that they were not canals, but that he did not know what they were. I think that sometimes the best of us think a thing so long and so hard that we end up by believing it."

The Directing Intelligence stood up, signifying that the interview was at an end.

"We will try it. There are still some questions that cannot be answered at the present time, but we will find the truth eventually. If we succeed, our race will indeed be worthy of the name of Conquerors. If we fail, we will die in empty space or on some planet that for the first time will feel the presence of human life. I—"

There was a slight buzzing of an instrument on his table. He adjusted a pair of earphones and then spoke some words. Immediately one of the Co-ordinators entered the room. While his face wore the usual expressionless gaze, there was something in his eyes that indicated news of the greatest importance. He lost no time in making known his errand.

"We have just been receiving some unusual messages at our radio-receiving station. We thought that you might like to know of these at once."

The Directing Intelligence nodded.

"What is it?" he asked.

"For several hours we have been receiving very strange communications. At first we thought they were in code, but then it dawned on us that someone was trying to communicate to us in actual language. We decided to call in the Specialist in Philology and he told us that every time the message came it was in a different language, but that each time it meant the same thing. For a long time the dead languages of the Middle Men were used—ancient Chaldean, Egyptian, Greek, Basque, the old Gaelic, and a dozen of others. Then came medieval languages and modern —Italian, English, Russian, and other European languages —and finally, as if to show their thorough mastery of every language, they sent the message in our own tongue: first, as we spoke it ten thousand years ago, and later on just as we use it today. I suppose that message came in over a hundred different forms."

"It's easy to understand why it came that way," commented the Directing Intelligence, "for whoever was sending it was not sure of the language that was being spoken here and in order to make sure that it would be understood he used every language of every age. What was the message?"

"A peculiar one. Simply this:

"'*Follow Number 85.*'"

"That's very interesting. What does it mean?" asked the leader of the Conquerors.

"We don't know. That was why we wanted you to know of it at once. You, as the Directing Intelligence, are all-wise."

The Directing Intelligence turned to Brunton. "I am afraid my people will need another treatment from you. You see, they rely on me completely. They have no initiative."

Then, turning back to the stolid Co-ordinator:

"I do not understand it. Broadcast the question at once to every Specialist, '*What does 85 mean in connection with this message?*' Say that an answer is to be given at once. I will await a report."

He waited. Specialists in America, in Africa, in Asia, in Australia caught the question flying with the speed of light through the air and reluctantly replied that they did not know. As answer after answer was flashed back it was more and more apparent that the question would remain unsolved. Meanwhile Whitland and Brunton had been dismissed and, at Whitland's suggestion, had gone to visit the central radio station of the Conquerors.

CHAPTER V

The Middle Men Report

"IT was the next day when the two men, haggard and weary, appeared before the Directing Intelligence.

"Have you found the meaning of that strange message?" asked Whitland.

The dwarf shook his head. "I have two hundred negative replies from two hundred Specialists."

"I think we have found an answer," Whitland said calmly.

The Directing Intelligence fixed keen eyes on the astronomer.

"Since we left you, we have spent most of the time at your radio station," Whitland began. "Working in cooperation with its controller, we have been able to determine the general direction of the source of those messages."

"And that is—"

"From interplanetary space!"

Only the faintest movement of the Directing Intelligence's eyes betrayed any excitement over this astounding [redacted]

"Furthermore," Whitland continued, "the messages seem to come from the general direction of Venus, which is approaching inferior conjunction with the Earth.

"We can not say positively that the messages *do* come from Venus. But there is a likelihood that if there were intelligent beings on that planet and they wanted to communicate with the Earth, they would avail themselves of this opportunity when the two planets are closest to each other."

Another flicker of the Director's eyelids indicated that he was closely following Whitland's exposition.

"Now," continued Whitland, excitedly, "there remained the big question to settle! Suppose intelligent beings were communicating with us, what would their message mean? Remember that they said '*Follow* number 85.' They evidently wanted the message to reach only beings whose knowledge is sufficient to penetrate the meaning of this apparent code. And if we could do that, the Venusians, if Venusians they are, wished us to have a means of finding them."

He paused for a moment to regain his breath. Brunton placed a supporting hand on the little man's arm, meanwhile looking at him in admiration.

"Now I deduced at once, that any means of communication for such a purpose could be one of two things: either a radio beam such as you use for guiding airplanes, or a ray of light perceptible to our spectroscopes; the number eight-five could refer to a wavelength or some other quantity. But, acting on the 'hunch' which is often the means to great discoveries, I tried a new tack. In the scale of the atomic number of various elements there are two missing places—one is number 85 and the other, number 87."

"What are these substances?" asked the Directing Intelligence.

"That is the interesting point. We all know that hydrogen has the atomic number one and from there on we go up to and include the number 92. Of course, some of these substances are very rare, but we are sure that all of them exist. However, 85 and 87 are missing numbers. We feel sure that they exist somewhere, but we have not found them on the Earth, nor have we been able to identify them in any spectroscopic analysis of the light from the stars. So they are simply unknown elements, the existence and characteristics of which we can only guess at."

The Directing Intelligence turned slowly in his chair so he could look directly at Whitland.

"Then you are saying that you know something about a thing, when in reality you know nothing about it?"

"Yes. That is my position. But—suppose that this message is from some form of life in Venus? They tell us to '*follow* 85.' The very word *follow* implies that they know, or hope, that somebody contemplates a trip to their planet. It looks as though they were trying to help us to reach them. They give us a pathway! Oh, that is a stupendous idea, but it may be possible! Suppose they are sending us a ray of light that gives distinctive bands in the spectroscope—a spectrum different from any so far known? Then all we should have to do would be to mount a spectroscope in the front of the car, and, by automatic control, keep the nose of the space car continually in that ray of light."

The dwarf raised his hands in protest.

"Do you mean to say that we could follow a ray for 26,000,000 miles?"

"Well, there is no need to," interposed Brunton. "The way we look at it is that you will have your own means of getting to Venus. Your Specialists with the aid of Mr. Whitland are perfectly competent for that. But, my word! Suppose you find that your own path checks with a beam of light with the characteristic spectrum that we think belongs to '85.' Then you would have definite proof that some beings on Venus want us to come!"

"And the ray is there," Whitland said. "It must start from the same place that the message came from. We know that we are continually receiving light from Venus. What is that light but rays? Suppose those people had a great quantity of this element number 85 and were to heat it in large enough amounts to send out a radiation? It may be that the entire planet of Venus is composed of this substance, but that up to now the thick blanket of steam has been able to hold the rays back. Perhaps they have found some way of blowing that fog aside for a short time? I don't know! But if I could lay my hands on a spectroscope, I should like to see just what kind of light is coming from Venus at the present time."

"We have a small telescope right here, also a spectroscope."

"I would much rather use my own in Arizona. Should you object to my returning there for a few hours of observation?"

"Suppose you use our apparatus first. If you don't obtain results, we will consider your request," was the decision of the Directing Intelligence.

Sir Harry thought that he was fairly well acquainted with the geography of the Reelfoot Crater, but this was the first time that he had heard there was an observatory there. However, early that evening the party was in it, and Percy Whitland was feverishly adjusting the mechanism of the telescope in harmony with the spectroscope. At last he finished and the "evening star" was brought into the optical field. With him were the Specialists in Astronomy, Chemistry and Mathematics, as well as the Specialist in Aviation and the Directing Intelligence.

"Now, we can watch the spectrum appear. I presume we are all familiar with the various lines. I should like to have the opinion of all of you as to just what we are seeing."

Slowly the bands of light began to form until finally they became stationary and unchanging. Whitland sucked in his breath, with an astonished gasp, but the Specialist in Chemistry nodded his head with conviction.

"That is new!" he said slowly.

"It certainly is!" agreed Whitland. "We are looking at the spectrum of an element that so far has never been identified. It is different from any stellar spectrum I have ever seen, and there are certain lines there which make me

confident that the light is originating from a luminous element in practically a pure state. It comes from Venus! Gentlemen, here is my advice. Change the nose of your space car so that the very tip forms the end of a telescope. Make that telescope as nearly perfect as possible. At the inner end attach a spectroscope. You will find then, if my deductions are correct, that the path you have chosen for reaching Venus will keep your space car always in that ray of light."

"Just one more question," said the Directing Intelligence. "We know that all the stars are made of many different elements in combination. What basis have you for the belief that this is the spectrum of but one element?"

"I told you that I was not absolutely sure," replied Whitland, and there was an element of weariness in his voice. "But it is a reasonable deduction. They may have collected it, or it may be natural—a huge mountain formed of one element. Or Venus may all be of that material, and we never saw the spectrum because of the clouds. All this is not new. There are many scientists who are confident that the core of the Earth is a solid ball of nickel and iron. Around this central ball is a stratum of liquid silica and magnesia. The outer crust is made of silica and aluminum. I don't know whether such a geological statement is correct, but I mention it to show that many good scientists favor the idea of an earth core of almost pure metal. Something like that will be found on Venus. At the present all we can say is that we are looking at the spectrum of a new element which has an atomic number of 85. The message we received tells us to follow number 85. I think that this spectrum is the answer."

Slowly the Directing Intelligence shut his eyes. The veins in his forehead enlarged and pulsed rhythmically. Little beads of sweat came out on his domed forehead. Ten minutes passed, twenty minutes—and at last he spoke:

"I direct that the changes in the space car be made."

IT was late, very late, when the two Middle Men returned to the Brunton apartment. Miss Charlotte Carter was waiting for them. She had personally prepared a midnight lunch for them with some hot fluid that tasted and smelt like cocoa. When they entered the living room, she was busy darning stockings, and there was no doubt about the fact that those stockings were the property of Sir Harry.

"Well, my dear friends," she exclaimed, "You certainly have had a day and a night of it. At this rate, all of your business will soon be attended to and you will have nothing to do and no place to go. Do you think you can stop long enough to eat lunch before you return to work?"

"My word, Charlotte!" sighed Sir Harry, sinking heavily into an easy chair. "I hope there's nothing more for the next twenty-four hours. It was not just physical work, but the tremendous task of trying to follow the scientific discussion of these Conquerors—and Percy. My dear, you would have been proud of Percy if you could only have heard him strut his stuff before the rest of them. He made them look pretty cheap, with all his accumulation of knowledge, and it looks very much as though he would be the next Directing Intelligence if anything happens to the present incumbent. They don't like to acknowledge that he knows a shade more than they do. It makes them feel a little peeved, but he made them admit it. Looks as though our friend Percy Whitland were a real man, and I hope you will never admire him as much as I do, for if you do it is all over with your present admirer and humble slave."

Miss Carter blushed, as did the man from Arizona.

"He's just teasing us, Miss Carter," protested the little man. "You know how these people look up to Harry."

"They look up to me all right," acknowledged Sir Harry, "but it's on account of my six feet three inches instead of any special amount of brains. But to change the subject, Charlotte. What do you think happened to keep us away so long? We actually received messages from Venus, indicating that sentient creatures want us to go there. And had it not been for Percy, no one would have had the least idea what those messages referred to. My word, but he made their eyes bulge out when he showed them their real meaning! Let's eat and then try to get some rest."

The minutes passed in silence while the tired men satisfied their hunger. At last the woman spoke.

"And are we really going to Venus, Harry?"

"Yes, some of us. Perhaps the Directing Intelligence, the three Co-ordinators, about one hundred of the Specialists, and Percy. I suppose they will take me along."

"How about me?"

"Why, I was going to propose that they let you go back to New York City. Your nieces will be delighted to see you."

Not Going to Return

SLOWLY she put down her work.

"Don't you understand that I can not go back? Not now! And I certainly am not going to stay here all by myself. Suppose something should happen to you while you are on the trip? Who would take care of you? There may be life on Venus and perhaps you might not be able to return, and would just stay there and marry one of those women."

"What women?"

"Why, those women on Venus."

"My word, Charlotte! You know I wouldn't do that. How could I without a preacher?"

"Men have done it before. Please, Harry, promise you and Percy will take me with you!"

"I don't see how I can—all right, I'll try! Please don't cry—don't even look as though you were going to! You see, Percy, the little lady loves me, and when she remained here she naturally thought we would slip out to a church somewhere and be married by a preacher. But she discovered too late that these Conquerors don't have either a church or a preacher, so we couldn't get married. She has been just as nice as everything about it, but it was a great disappointment to both of us."

"I believe I can do something for you when the right time comes," said Whitland. "But to change the subject, Harry. When we start on the trip, what's going to happen to all these poor slaves they have here, and to the rest of the nation?"

"That bothered me for a while, but I have proposed a plan to them that has finally received the approval of the leaders. I think they will start to put it into effect tomorrow. Their first plan was to kill everyone they left in their underground cities, even their own people; for you see, without the leaders, the mass of the Conquerors are helpless. Then when they came back they were going to start a national life with new units. You see, they perpetuate their race like ants or bees, and have only a few females; almost all their active units are simply neuter workers. But I proposed that they give each person a somnifacient* hypodermic, dosed to last at least a year. If the dose is not repeated at the end of a year, the units slowly die a painless death. If desired, they can be given another sleep hypodermic or they can be given an injection that will restore them to activity. So, that's what's going to happen. When we leave the Earth, everyone in their

* Sleep-producing.

crater cities will be asleep, and if we don't come back in a year's time, they will remain asleep—forever."

"That's one reason why I want to go with you men!" declared Miss Carter, emphatically. "It's that little doubt about your coming back. If you don't come back, I shall never be happy unless I'm there with you. What would life be worth to me if I had to wait year after year, hoping against hope for your return, and knowing year after year the hopelessness of it?"

"Charlotte!" said Sir Harry, and there was a warm, vibrant tone to the word, "do stop worrying! If I go, you go! Perhaps—why, perhaps we may find a preacher there, who knows! Now, be a dear and go to bed. I want to talk a little to Percy before we turn in."

SO the little white-haired lady said goodnight and left the room. The two men watched her till she disappeared and then Whitland whispered:

"She certainly is in love with you, Harry."

"I know that. My word! Think of her giving up everything just to stay with me. What's your reaction to all you've seen and heard, Percy?"

"Looks like an adventure to me, a grand adventure!"

"Do you feel any different since you found out that you are practically a Conqueror yourself?"

"No, I don't think there's very much change in me."

"You still feel that you're a human being, one of us, the same kind of being that I am?"

"Yes, I guess so. It's like this: I have their blood in me and perhaps their intellect, but at the same time I still have all the emotions of an ordinary man. I can harmonize with them intellectually, but when I see their faces, absolutely devoid of feeling, I grow cold all over, and it makes me shiver when I think of their plan to kill the human race—when they come back from Venus."

"I see. Then I can tell you something. . . . They have promised me that they will not slaughter mankind till they *return*. They are going to Venus, Percy, and we are going with them, and it looks as though Charlotte was going, too. But Percy—*we are not going to return!*"

CHAPTER VI

Final Preparations

FOR the next two weeks there was a hum of ceaseless activity all around the giant air-craft. Had it not been for the super-human intelligence of the Specialists, the perfection of their robots and the perennial surplus of human slaves, the necessary changes involved in the placing of a telescope in the nose of the machine could hardly have been made without actually rebuilding the space-flier.

But after the plans were drawn up, the actual construction was attacked from a dozen points at once, and at the end of two weeks, not only was the telescope in place, but arranged mechanically so that it could always be pointed at Venus. Whitland, seated in the specially constructed cabin-observatory, had the satisfaction of looking through the scope at his old familiar friend, and of personally adjusting the spectroscope so that every ray of light that entered the telescope had to pass through that spectroscope, to be instantly broken into the broad, multicolored bands of the spectrum. The plate that finally received this broad band of many-colored lights was delicately adjusted to control the mechanism that controlled the telescope. Gyroscopes, set in three planes, were able constantly to control to a fraction of a degree the course of the ship so that it would always be pointing in the direction of the chosen course.

This course had been laboriously plotted by a consultation of the Specialists in Mathematics, Astronomy and Aviation together with Percy Whitland. The shot was to be aimed at a point in the orbit of Venus, where it was expected the planet would be in four weeks, the time allotted for the journey. This point was to be the inferior conjunction with the Earth.

Once the flight was started and the void of space penetrated, all that would be necessary was to see that enough power was developed to maintain a sustained flight through the vacuum.

The new spectrum remained constantly true to type. The scientists studied it from every point of view, and they were all satisfied that the light was proceeding from a new element. Some wanted to call it *Venusore*, but the majority favored naming it *Whitlore* in honor of the new Conqueror from Arizona.

No more messages had come from the distant planet—a circumstance that caused some comment. Was the cessation of communication due to the senders' knowledge that the message had been understood, or had they been disappointed at their failure to receive an answer? Either way, they would soon find out the real truth. They had sent a message to the Earth, and the Earth was replying with a space ship, loaded with Conquerors!

As the need for the slaves came slowly to an end, they were collected by hundreds and thousands and given their sleep-producing hypodermic. This seemed, to many of the Conquerors, like a useless expenditure of time and effort, but it was the command of their leader, and they had obeyed passively for too many thousands of years to disobey now. Skilled experts entered the Queen house and put to sleep the females, who knew no other life than that of propagation. The endless belt in the incubator house was stopped, and the premature infants were taken out and disposed of. The nurseries were visited and all the baby units put to sleep.

THE little ones who never had known and never would know the embrace of a mother's arms were lulled by a needle. In the laboratories where human experimentation was in progress, the subjects of incomplete scientific investigation were sunk into a narcosis, which would put an end to the mental torture of their countless humiliations for a year to come. Last of all, on the day before the actual departure, all the Directors and over 125 of the Specialists were assembled at Reelfoot, placed in long rows on the floor of one of the dry caverns, and there stupefied so that, when the rest of the nation returned, they could be awakened to a life of renewed and devoted usefulness to the nation.

The hum of work had come to an end. The Specialist on Aviation and his assistants again and again went over every part of the machinery on which the lives of a nation depended. At last they were satisfied. All the stores were in place. Every person had been assigned to his special cabin. A definite work was allotted to each individual.

Only Miss Carter seemed without a specific task. The Conquerors were not pleased with the idea of taking her with them, but, as usual, Sir Harry had been able to carry his side of the argument. It seemed that she darned his stockings, and no one else knew how. He argued that he was not capable of doing his best unless his stockings were darned, that no one could darn them except Miss Carter, and how could she do it from day to day unless she was with them? and—

But the Directing Intelligence made Sir Harry stop there.

"I never could understand what you wanted this thing for, Sir Harry. It is true that I had her brought here, because I had the idea that all Middle Men wanted female

things like that for their slaves; but instead of making a slave of this one, you treat her as more than an equal. You don't even live with her, because you haven't found the proper person to say words before. You have said that it would be a real vacation to you to make the trip. How can you be happy and have pleasure in your vacation if that useless unit goes with you?"

"I tried to explain about the stockings."

"Don't go all over that again. Take her with you if you want to, but keep her out of sight."

FINALLY everything was done. The day and hour for the departure was set. At the last moment a careful check-up of the food requirements made it necessary to eliminate twenty-five more of the Specialists, and these were put to sleep along with their dormant fellows. The actual embarkation was begun. Every passenger was in place. Percy Whitland, the Directing Intelligence, the Specialists in Electricity and Aviation were in the pilot-room back of the telescope. Nothing remained to be done except for the Directing Intelligence to touch the button that would initiate the first rush of power through the stern rocket tubes, causing explosions that would in minutes place the car well out of the earth's atmosphere, and, in a few hours, far beyond her fatal attraction of gravitation.

A Conqueror in charge of the task of shutting down the central radio station approached his Specialist with a message. The latter searching out a Co-ordinator transmitted the message to his superior who in turn sought out the Directing Intelligence, who was holding a long and earnest conversation with Whitland in the control room of the ship. The Co-ordinator spoke in the strange tongue of the Conquerors.

The Directing Intelligence turned to Whitland.

"The same thing is happening that took place the other evening. Messages are coming through space in every language known to mankind through the ages. The message is always the same, no matter what the language is. It is this:

"Protect against 87"

"Another element!" exclaimed Whitland. "First comes the instruction to follow 85, and when we are all ready to do that, we receive a warning to protect ourselves against 87! But that's the other unknown element. How can we protect ourselves against something that we are ignorant of!"

"You think there is a danger?" asked the Director.

"There must be! We have always felt sure that there was an element with atomic weight 87, but we have never been able to isolate it. These friends of ours on Venus know not only the element 85, but also the one numbered 87. They must realize that it possesses power deadly in some way to life. They feel that we are ignorant of it, and so, have decided to warn us of it."

"That sounds reasonable," agreed the Directing Intelligence, "You believe that such an element exists in space and yet our scientists remain ignorant of it?"

"Yes, I think I can explain that. The Earth is blanketed with an atmosphere. That atmosphere has, as one of its important elements, a large percentage of oxygen. There is no doubt that this blanket shields us from the intensity of the cosmic rays. Some of these are changed to heat rays, and some may be totally blocked in their attack on the Earth. The people on Venus may realize our ignorance and may be trying to warn us of a danger that will come as soon as we reach empty space."

Indecision

"BUT you told us the other night that space was empty."

"So I did, and so it is. Empty of stars and planets and meteors, but not empty of rays of many kinds. Matter is constantly being annihilated in space, and the amount of energy made available by that annihilation is tremendous. The Swiss scientist Hess and the German, Kohlhoerster, have made a special study of these stellar rays. Their conclusions show that only by a miracle has life been able to continue on this Earth. The X-ray used to be dreaded, the Gamma ray of radium feared, but both of these can be stopped by a thin sheet of lead. But there are cosmic rays that can pierce through one hundred and twenty feet of water and sixteen feet of solid lead. Our atmosphere protects us against these. We are taking a trip into space where there is no protecting atmosphere. There is the danger!"

"But our Specialists assure me that all this has been taken into consideration and provided against."

"I believe they are correct—to the extent of their knowledge. There is no reason to doubt the fact that the walls of our space-ship form ample protection against such rays that we know about. But how about the rays from element number 87? How can we protect against a danger concerning which we know nothing?"

"There are only two things we can do," said the Directing Intelligence. "Either remain for further study, or touch the button that will send us into space."

Somehow the news spread through the ship. A low buzz of conversation filled every room. Minutes passed and at last an hour, leaving the Directing Intelligence still undecided as to the proper answer to the puzzling question. Finally he refused to assume the entire responsibility and called for a conference of ten of his leading advisors. This number included the three Co-ordinators, Sir Harry and Percy Whitland. The entire problem was stated to them and they were asked for an opinion. Several of the ten refused to express themselves, merely replying that their previous experience and acquired knowledge were insufficient to throw any light on the difficulty. Whitland had told all he knew when the message first came. To the surprise of all, including the orator himself, it was Sir Harry Brunton who decided the matter for the conference, and what he said was not a solution but a challenge.

"We call ourselves the Conquerors!" he almost shouted to the other nine men in the room. "We pride ourselves on the fact we have for thousands of years ruled the Earth with an intellectual rod of iron. For a century have been planning for a voyage in space, to find new worlds to conquer. My word! Are you going to hesitate because of a simple message? A few words that mean nothing and may be simply the idea of some idiot? We are all ready to go. If we hesitate now because of a supposed danger, we will never go, for as fast as we protect ourselves against one danger there will be another develop to scare us. Never before in the history of the Universe have men come so near annihilating space as we came today, and are we to hesitate, turn back, nervously frightened at something we do not understand? That is not the way the Americans play poker. I am an Englishman—at least, I was one till you adopted me into your great nation—but even the nation I have renounced never knew when to quit. My vote is for an immediate starting of the journey. Let us deal with each danger as it arises!"

When he was asked, in later life, about his reactions at this most perilous moment, Sir Harry smiled. He was not certain, he said, that his appeal would have any effect on these stolid emotionless people. But as an anthropologist he had believed that one's emotions can never completely

die. A spark of them always remains, that may be quickened into life. As he looked at the Conquerors, on the completion of his speech, he did hope and feel that something vague and dormant had been touched ever so slightly and there was the merest stirring of something strange inside of these emotionless beings. . . .

THE Directing Intelligence looked around the council. He must have gazed most intently into each face. Then finally, as with an effort he arose, signaled to the Specialists in Electricity and Machinery and to Percy Whitland to follow him into the pilot room. As the entire ship rested at an angle of 45 degrees all motion was by movable stairs, but at last the room was reached and the signal was passed through the ship to prepare for flight. Each passenger securely fastened himself in a pneumatic chair, built to protect against the violent displacements which might occur during the first few minutes of flight.

Then the leader of the peculiar nation, known to us as the Conquerors, touched the button.

With a tremendous roar, the great space flyer rose from the pit and sped like a silvery comet through the atmosphere into space. Up, up it went and gradually its nose was turned to the point in space where there was to be a meeting with Venus four weeks hence. The man in the pilot-house saw the needle of the speedometer swing slowly around as the space visitor gradually gained in speed. So far as they could tell, the automatic control was working perfectly, there being not the slightest change in the spectrum. The propulsive machinery of the ship was also delivering its power in such a smooth flow that there was little throb, little noise, only a continuous power, a mighty propulsive force that shot the silver needle through space that had never known a human visitor.

Hour after hour the four sat in the pilot-house and then, when satisfied that all was well, the Directing Intelligence and Whitland left. The astronomer went at once to Sir Harry's cabin.

"That was a fine effort you made, Harry," he said. "For a while I was almost enthusiastic myself over the prospect of a safe trip. Then I saw, or thought I saw, your idea."

"My idea?"

"Certainly. You've never forgotten that you are an Englishman. Your country comes first. You want this trip started. You know why."

"Percy! Are you a mind reader?"

"Not much of one, but enough to follow your mental processes."

"Then suppose we hunt up Miss Carter and have something to eat? They loaded the storage rooms with food tablets, but I have an idea that by this time the little lady has taken six of those tablets and converted them into a palatable meal. She must be worried. She's a splendid little lady, Percy."

"You bet she is! I have something in mind for you two."

Meantime the spare-machine shot on steadily into space. It was flying in an almost complete vacuum, and consequently, meeting no resistance, its speed became greater and greater. Finally the men in the pilot-house had the satisfaction of seeing that they were traveling at a speed of about 40,000 miles an hour, that would bring them to Venus on the twenty-seventh day.

Hours passed by, and days, without the slightest change in the program—days devoid of the least unusual experience. The passengers soon adjusted themselves to the deadening routine of the enforced confinement.

Meantime, it must not be thought that the departure of the space-flyer from the Rexfeot Crater had passed unnoticed by the other peoples on the Earth. During the initial hours of its flight the ship had at once been noticed and followed by many astronomers. While numerous explanations were offered, only two men, Mallory Wright and John Ormond, had a clear conception of what it all meant to mankind. They knew that the Conquerors were off into space and that Sir Harry was with them. They also knew why he was with them, and they were confident that in some way he would, single-handed, hold back these scientific wolves from their desire to destroy the human race.

CHAPTER VII

Van Maanen's Star

IT was not till the sixth day of the interplanetary trip that trouble started.

Despite its automatic controls, the ship seemed unable to stay on its course. Time and time again, rocket shots on the side of the ship would point its nose toward the point in the heavens that determined the ship's course. But, as though an invisible hand were drawing it away, the ship seemed to turn about, or as one of the Conquerors expressed it, "the heavens seemed to swing around to the left."

The spectrum from Venus, however, continued to show the presence of element 85.

With the greatest difficulty Whitland and the other Specialists put into operation a second telescope with spectroscope attached and began to make observations of the light entering the car from other directions than Venus. Window after window was used as an observation point, but in every case a familiar spectrum was obtained. It became harder all the time for the robot pilots to keep the space car in its proper course. Several times it was so far out that it became necessary to fire a lateral rocket for a ten minute period to shoot the car back to its correct course.

After thirty hours of patient observation Whitland found what he was looking for—a new spectrum—and there was no question that it represented the element with atomic number 87. It was also perfectly easy to tell where the light forming the new spectrum came from. A fine spectrum was obtained when the auxiliary telescope was pointed directly at Van Maanen's Star. Was there something in that ray of light from that far distant globe that kept pulling the space car away from its course and into a direct line for the stranger, which was also in line with the sun? There was something there that made the car hard to operate. Perhaps, thought Whitland, the threatening star might even be a super-gravity attracter that would pull the car off its course so far that it would become lost in space or plunge into the sun.

The Directing Intelligence was called into consultation. As usual, Whitland acted as spokesman. More and more he seemed to be recognized as the leader of the intelligentsia on the space car.

"The trouble," began Whitland, "is caused by a star called Van Maanen's Star, named in honor of the celebrated astronomer who discovered it. Yes, we have known of that star for years, and we thought we had its spectrum—but—and there's the rub—the most vital of its rays must have been shut off from our Earth telescopes by its blanket of atmosphere. On the Earth we could see it but very faintly. In luminosity we considered it one of the faintest of stars, having but one six-thousandth of the light of the sun. Yet it has a surface temperature of 7,000 degrees; so we have calculated that it must be a trifle smaller than the Earth, probably only one-hundredth the diameter of the sun. One million such stars could be packed inside the sun and still there would be some spare room. Now, here is the astonishing part:

"Though it is slightly smaller than the Earth, it weighs one-fifth as much as the sun does. This fact necessitates packing the average ton of matter into the space of a cubic inch. We feel that matter is packed rather closely in the Earth, but the atoms in this star that is giving us so much trouble are packed to a density 66,000 times as close.

"That is packing matter rather closely, and it cannot be done except by stripping the electrons from the atom till nothing is left except the nuclei. With such a density this star could go on radiating at its present rate for 15 million million years, without losing a thousandth of its matter.

"BUT much of this star—not all of it, but evidently most of it—is formed of this—to us—new element, number 87. Without doubt this star has powers which up to the present time have not been suspected. Evidently for millions of years it has radiated a queer sort of energy that exerts a serious effect on our instruments and observations. I do not know what happens to them, but we may know if any of us are alive when our space car gets to Venus or falls into the sun. For the truth is that our course is being diverted to the left, in other words, toward the sun. That means that Venus will pass by us before we get to her and unless we can check our speed there will be nothing to prevent a plunge to the sun. No doubt we shall be simply a mass of incandescent metal before we hit the sun!"

"How far away is this dangerous star?" asked one Co-[illegible].

"Probably many, many light-years."

"And Venus—?"

"Is about eight days away."

The Aviation Specialist had spent many years of his long life in constructing the machinery of this space car. He had made it. It was his child and he had faith in it. He spoke up now to show his trust in it.

"Then we will fight this danger! We will put all the available power to work through the end rocket tubes and at the same time we will start as many of the steering tubes on the right side as are necessary to keep the car in her course. I am not sure how much power we can develop in those side tubes, but we can at least try. I am going up to superintend the machinery personally. Keep me informed as to the progress we are making, for I don't want to use any more energy than is absolutely necessary."

And then began one of the strangest, weirdest battles that time and space have ever known. On the one side, a mighty star, ceaselessly pulling a little midget toward it; on the other, that little midget, the space car of the Conquerors, fighting on and on, minute by minute, hour following hour, to pull back from the threatening doom and hurl itself forward on its true course. Breathlessly the observers looking through the telescopes saw the heavens swing back and forth, as though they were on a pendulum. Long hours passed, yet each of those hours was bringing the voyagers nearer to Venus! At one time the pull of the car was so strong that the nose was pointed directly toward the sun, and all recognised that they had changed their course and were headed directly toward their doom. The Directing Intelligence phoned down to the Governing Room:

"Have you any more power?"

"Yes. I have two side tubes that I have not used."

"Use one of them!"

Anxious Hours

THERE was no appreciable change in the course. Eternities passed as the clock ticked off five minutes. Then:

"Use the other tube!"

If this failed, their last hope was gone.

But it was enough! Nothing to spare, but enough! Slowly the heavens swung about, the nose of the car gradually turning toward the point where the meeting with Venus was expected. A whole day passed, then, as an experiment, some of the side power was checked. It was found that it was no longer needed. Finally only the four end tubes were in use.

David had again won out in the age-long battle against the giant! The little space car, aided by distance, had been able to resist the threatening doom and was once again safely on its path toward the "evening star."

Five days had passed unheeded in the struggle. During those five days the leaders had gone practically without sleep. Hollow-eyed, Sir Harry staggered through the car and finally came to Miss Carter's cabin. He knocked at the door and almost fell on the floor as she opened it. When he awoke, she was bathing his face.

"Are we saved, Harry?" she asked.

"Yes. It looks now as though we should reach Venus! What have you been doing all this time?"

"I've been darning stockings!"

"My word! But there weren't enough holes to keep you busy, were there?"

"No. But when I had darned them all, I made new holes and darned them! Now you're to eat something and take a long sleep."

On the twenty-third day of the trip nine-tenths of the power was shut off. It would have been disastrous to enter the atmosphere of the "evening star" at the speed which the usual space body makes as it hurtles through infinity. Even with this reduced speed, the end of the day brought them so relatively near their objective that the planet, veiled with mists, loomed to a third the size of the moon as seen from the Earth. But now Venus was seen as a silver crescent. The sun's rays, reflected from this opaque mirror, came back with dazzling intensity through the windows of the car. The heat was growing more intense. Even the careful insulation, planned by the builders, was almost insufficient to prevent suffering. The air in the car seemed vitiated, hardly able to sustain life.

It was a period of the greatest anxiety for the three representatives of the Middle Men. The Conquerors met each new difficulty with their usual unemotional stare, but the Directing Intelligence confided to Percy Whitland that he regarded the next forty-eight hours as fraught with the greatest danger.

Through the telescope they could now see the great mountain peaks of the South Pole looming through the dark mists. The spokes of the planetary wheel were visible through the swirling vapors, though it was impossible to make out the details.

"My suggestion," said Whitland, at the end of the twenty-fourth day, "is to slide into the atmosphere at the slowest possible rate of speed and at an angle as acute as possible. This will allow us to come close enough to the surface to obtain sharp geographic details, which we must have in order to select a safe landing place. Of course, it would be death to land anywhere on the dark side, and equally disastrous to fall into the desert. The only safe place is in the narrow zone of perpetual twilight, where the maximum amount of water is."

FOR many hours the gravitational pull of Venus had been drawing the space car toward her surface. The time came when all propulsive power had to be shut off and every rocket brake at the front of the car turned on to counterbalance this pull. At last the momentous instant was at hand when the car slid into the atmosphere of the

unknown planet. Sliding sidewise into it, they were slowly enveloped in swirling mists, which hung around the car with long streamers as though trying to lure it down to an easy death. One mile—and two—and five—they descended, as slowly as possible, until at last they could see a wrinkled landscape some five miles below them—a parched, senile, atrophied land, swept clean as a parlor floor, polished with the dust storms of endless ages, a land on which nothing, not even one-celled organisms, could long survive.

Whitland's astronomical calculations made him certain that the part of the planet on the sunward side of them, was at that time swinging a hundred miles toward the sun in the peculiar movement known as oscillation. He concluded that the sunward side was the choice position for a landing, and subsequent events showed that he was correct. Propulsive power was slowly turned on, and the silvery visitor sped over the desert of death like a living thing, frantically endeavoring to escape a certain doom. Slowly they saw, from the pilot cabin, a gradual change come over the details of the landscape. First came steaming mud flats, where the eternal conflict between heat and water was going on as it had been doing for eons past. In the course of a thousand miles more of travel these mud flats changed to rivers, banked on either side with green fields and later with lofty forests. At last, as far as the eye could see, were rivers, very wide and swift, and forests, dense and green. Visibility was perfect.

The adventurers were now a mile above the surface. Two problems had been claiming their attention: the selection of a landing place and the composition of the atmosphere. There was little doubt as to the presence of oxygen. If those great masses of green below them were trees such as grew on Earth, then they were constantly throwing off oxygen, and in that oxygen men could live. At the same time, it was felt to be necessary to actually determine its percentage, and accordingly, at five different times specimens of the air were obtained and examined. So nearly like the air of the Earth was it that, when the car was guided to a position one-half mile above the surface, the windows were cautiously opened and the interior of the car ventilated. Instantly the new air restored the vitality of the passengers who had for days breathed air that had been chemically purified. One of the dangers was thus passed, one of the questions solved. So far as the atmosphere was concerned, it was now definitely established that the "evening star" would support animal life.

But where could the space car land? The answer was at hand. Slowly there loomed into sight a white spot, almost a perfect square, which later on proved to be a marble pavement. While the forests were dense on all four sides, vegetation had failed to obtain a footing on the tessellated floor. It offered a perfect landing field, so perfect that it seemed as if made for the purpose. Lower and lower swung the car, until at last, poising securely and exactly above the white field, it dropped like a feather and almost noiselessly came to rest.

The Stillness of Death

THE adventurers had reached their objective. That part of the journey, at least, was over! Man had once again achieved the impossible! Space, 36,000,000 miles of it, had been conquered. The long journey was at an end.

Carefully the side doors were opened, ladders lowered, and a few of the passengers allowed to leave the space car. Meantime all was activity inside the car. Supplies had to be selected, weapons overhauled and prepared for any eventuality. It was impossible to tell what the life on this world would be like, and still more impossible to foretell whether or not it would be friendly. The Conquerors were determined to be prepared for any eventuality.

For defense they relied mainly on their electric torches. Wielded by their large, capable hands, these made excellent weapons. Sir Harry had his two revolvers and an adequate supply of ammunition. But the invaders indulged in the hope that there would be no need of fighting the life on Venus. They believed that the intelligence of the race that had communicated with them would be so high, their type of morals so lofty, that an easy rapport could be established. This voyage was not one of conquest but of exploration. There seemed no reason whatever to doubt the friendliness of the beings that had sent the two messages, one of advice and the other of warning.

Outside the space car all was calm. The gigantic forests grew on all sides of the platform, the trees rearing their individual heads so high that the marble area almost seemed like the bottom of a deep well of verdure. There was no sound, either of bird, beast or insect.

"This is the stillness of death," whispered Percy Whitland to Charlotte as they stood in the soft glow of the perpetual half-light. "I almost think I can hear a slight murmur, either of a river near-by or of a current of air blowing some miles over our heads into the land of perpetual night. Otherwise, the stillness makes me think of my nights in Arizona, looking at the distant nebulae."

Sir Harry, strolling up to them, overheard most of this remark:

"My word!" he exclaimed. "It may be still, but I don't feel that it's safe. Whenever I was exploring new territory on the Earth, I always dreaded a complete stillness. It always preceded an attack from the savages. When the native is happy and care-free, he is chattering and his tumult wakens all the little things in the forest; but when he is silently approaching to attack, his stillness seems to affect all other forms of life and they keep still with him. Look at those trees! Like nothing I have ever seen—more like giant ferns than oak or pine. They could conceal a thousand or ten thousand creatures and we be none the wiser for it till they started to rush us. I've just had a talk with the Directing Intelligence. It is over eighty thousand years since a generation of Conquerors have been forced to fight for their lives. I'm not sure how much vigor they would be able to put into a real fight with lower forms of life."

"But maybe there aren't any lower forms of life here, Harry," said the little white-haired woman.

"Lower or higher makes no difference. They're all dangerous till they're proved otherwise. Percy, have you noticed this floor we are on? It reminds me a little of the floor of a Maya citadel I once saw in Lubaantum. Only there you could tell where the joints came between the stones, though they were fitted so closely together that I couldn't slip a knife-blade in between. But here there seem to be no joints. It appears like one solid mass of cement which has become highly polished through the agency of the continuous wind. Later on, when the water came, the forest grew, but they were never able to obtain a footing here; there are absolutely no crevices."

"WHAT do you suppose it was for?" asked Charlotte.

"Hard to tell. Perhaps a place of worship, or a platform for astronomical observations. They may have used it as a foundation for a fort or even a landing place for aircraft."

The explorers at once realized that in their new surroundings there would be no darkness or night. The soft glow of the sun always remained of the same intensity. Orders were at once issued, setting aside a certain portion of the twenty-four hours for rest and sleep. A daily routine was established and each of the adventurers had definite

duties assigned to him. It was decided to make a complete scientific investigation of the landing field and neighborhood, and then, if no signs of animal life were discovered, to move the space car to another location.

All had their daily work allotted to them with the exception of the woman. Miss Carter was completely ignored by the Conquerors. They never noticed her, never spoke to her, and seemed to have completely forgotten her existence. She never complained, but when Sir Harry was forced to spend more than the usual fraction of each day in consultation, she would address him as Sir Harry in a rather formal tone. Whereas she had been one hundred per cent scientist when she first met the tall Englishman, she was now rapidly changing to one hundred per cent woman.

She briefly announced her disgust with the entire situation one day.

"If we were in an unknown territory on the Earth," she protested, "we would at once start to explore the surrounding country for at least a hundred miles in all directions. Instead of that, you men or creatures or whatever you are, seem to be content to sit timidly here on this marble platform and wonder what lies hidden in that fern forest. I'm sick and tired of it! Nothing but plans and consultations and surmises. I'm going out and start something."

"Now, Charlotte! You're going to do nothing of the kind."

"*No!* When did you have the right to order me? How dare you order me! I'm on my way, and when you next hear from me I'll have some real news."

"But, Charlotte! My word! Do be reasonable! Who's going to darn my stockings for me if you go off like this?"

"I'm tired of darning your old stockings," cried the woman, as she walked rapidly to the edge of the snow-white platform, and then, starting to run, disappeared among the shadows of the ferns.

Sir Harry looked anxiously at the place where she had disappeared, and then started to go after her. But he was too late. A shrill cry of fear rose through the forest, a single cry from a woman's throat—then silence. And this time the silence was all the more terrible because of the fact that it had been so completely broken, if only for a second.

The Englishman started to run into the forest, then thought better of it and ran toward the space car to get his revolvers and cartridge belt. On the way he almost knocked down Whitland, who was in one of his usual arguments with the Directing Intelligence.

"What's the matter?" he asked. "What's your hurry?"

"Matter enough! Charlotte's gone into the woods and something has caught her! Didn't you hear her scream?" and he dashed up the ladder into the space car. A few minutes later he dashed out again, buckling his ammunition belt around him as he ran.

The Directing Intelligence turned his body slowly, so he could follow the course of the running giant. He commented on the incident to Whitland:

"I like that Middle Man in a way. He has been of some help to us, but I've never been able to understand his reactions to that thing he insisted on bringing with him on this trip. He evidently has no real need of her; yet he insists on having her around all the time. Now he's acting most peculiarly. Why not let her go?"

CHAPTER VIII

Strange Creatures

CHARLOTTE had gone into the fern woods with no thought of danger. Her principal reason for going was that she was angry. She kept on because she did not want to acknowledge that she was wrong or afraid. She heard a noise, turned, felt something fasten on her throat, screamed once, and then lost consciousness.

When she came to herself, she had a feeling that during her period of stupor she had been carried many long miles into the depths of the fern forest. She had no way of telling how far away she was from the space car, but she felt that she was so far she would never return. Glancing around at the strange living things that had captured her, she was more convinced than ever that she was hopelessly lost. She would have taken her chances with savages, or might even have had some hope of escape if she had been captured by animals, but these weird things that stood in irregular rows around her seemed to be neither man nor animal, at least, like no life that she had ever seen before. In some ways they all looked a little like the men and women whom she had known on the Earth, but they were different. Here a limb was so enlarged that the rest of the body seemed pitifully small; there a feature was entirely eliminated. Some were short and others drawn out to the thinness of a pole. Faces were changed, torsos distorted, duplicated, and even tripled. There were beings with duplicate faces, and others with no faces at all, but simply a single eye staring out of the chest, lidless and motionless. On one side stood a body on six legs, while near it stood a body with no legs, rolling as it moved over the ground with a certain clever agility. A thing that was certainly feminine held something to her breast with arms scaled like the trunk of a serpent. Close to Charlotte was a body beautifully formed but with the head of a pig and only one leg.

Charlotte shuddered and shut her eyes. She shrank screaming as something touched her shoulder and passed poisonously over her face. "Venus?" she asked herself. "If these are the inhabitants, what a strange name for them! The Venusians should be like Venus, the goddess of beauty. Here nothing is beautiful. It is like a page from Dante's *Inferno*, the hallucinations of a man in delirium tremens. It makes me think of the description of the people Lucian saw in his fanciful trip to the Moon, Lucian who wrote 'about such things as neither are nor ever can be.'"

"I am asleep!" she cried. "When I awake, I shall be back in my cabin—darning stockings—and Harry will drop in and tell me about the last consultation he has had with the Conquerors and Percy. I will tell him about my dream and he will laugh at me and say, 'My word! How odd!' and we shall both laugh, because it was just a dream." Then she opened her eyes and screamed again, for a thing that was a man above and a long snake below had come up to her and was putting out a hand to touch her.

ONCE again merciful nature forced her tortured mind to rest in unconsciousness, and this time when she awoke she was alone. Someone had prepared a bed of fern leaves for her to rest on, and perhaps it was the same being that had placed near her some fruit and a metal vessel filled with water. As far as she could tell, she was alone. But, as she ate her meal, quiet and cautious observation showed her that she was being watched by a hundred pairs of eyes.

The things could evidently move silently through the fern wood. It mattered not whether they had no legs, one leg or many legs, they were equally noiseless if they wanted to be. But, even as she was thinking how quiet everything was, they all started to laugh, and that laughter was like the ghoulish shrieks of maniacs hurled over the mouth of hell. Far away the echoes rescounded making all the more terrible the inhuman shrieks of pandemonium at play.

Charlotte did not have to wait long for an explanation of this laughter. The things drove into that circle somethat that had once been shaped like a woman of the earth. But in every way possible that body had been cut and bruised and broken, without killing the individual, ruining the soul, or destroying her power of suffering. Not an inch of her body but had been tortured during her hopeless years of captivity. Now they drove her into the ring for the final act of the drama; and because of the anticipated pleasure they laughed, emitting shrill shrieks of explosive respiration that sounded more like the cries of hyenas. Then they closed in on the thing that had once been akin to humanity; closed in on her, and over her, till Charlotte could see nothing but a struggling mass of abominations; and when they slowly tore themselves apart and once more stood separate, the woman was gone, but blood dripped from the mouths of all who had been fortunate enough to partake in the feast.

Then, as though excited by their blood lust, they started to make the circle around the earth-woman smaller. She knew what was going to come and she sent a prayer through the air. She knew the hopelessness of it, yet she sent it—to the only man she had ever loved enough to want to darn his stockings. She sent a message to Sir Harry and told him she was sorry that she had insisted on the preacher, and that if she had it to do over, she would marry him at once.

Just at the last second, when she knew there was no hope, a strange thing happened. The abominations started to drop! They dropped and died, moaning weirdly, perhaps as unable to understand the reason for their death as they had been unable to understand the why of their living.

And from that circle of death, an oddly-shaped creature stepped forth and spoke to the woman in perfect English.

(*To Be Continued*)

ANNOUNCEMENT

SCIENCE FICTION WEEK

OWING to a great number of requests from our readers, the week between March 31 and April 7 has been designated as SCIENCE FICTION WEEK. This period will be for our readers an opportunity to spread the gospel of science fiction throughout their city. We are certain that all followers of our magazines will wish to help in making known to everyone the existence and the power of this great educational force.

Our readers may do this in several interesting ways which will bring them into the public eye and mark them as the pioneers in science fiction. Boys and girls may give speeches to their school mates in their classrooms, telling of the pleasurable hours, the stimulation and knowledge that come with reading science fiction; men and women may speak to their fellow-workers and friends; others may write letters to their local newspapers for an editorial on the subject, and so forth. This is going to be a big week for science fiction enthusiasts, and those who assist in spreading the news will be conferring an immense benefit on all who have not yet had the pleasure and profit that comes from close acquaintance with science fiction.

— FREE —

In order to further this movement, the publishers of SCIENCE WONDER STORIES have printed some attractive poster-stickers in several sizes, which will be furnished free, postpaid, to all readers. These little posters are available in the following sizes: 6 inches, 4 inches, and 2 inches. Our readers can obtain these by writing to the Editor, SCIENCE WONDER STORIES, 98 Park Place, New York, stating how many they can use.

The purpose of the posters is to paste them in all available spots where they will attract passersby. Locations such as, show windows, newsstands, telegraph poles, blank walls, etc. can be used readily.

This is a big movement, and we hope that our readers will be sufficiently interested to get behind "Science Fiction Week" in a big way and do their bit in spreading the gospel of science fiction.

What Is Your Knowledge of Science?

Test Yourself by this Questionnaire

1—What is the shortest distance of the planet Venus from the Earth? (Page 968)

2—What are some of the physical characteristics which show that modern man evolved from a lower species? (Page 973)

3—What is the period of the revolution of the planet Venus around the sun? (Page 975)

4—How do we analyze the light from a heavenly body? (Page 977)

5—What does the science of ballistics deal with? (Page 989)

6—What is the kind of force which would keep a small celestial body near the earth from being drawn to our planet? (Page 987)

7—About how many asteroids have we been able to observe and classify? (Page 987)

8—What is meant by the fourth dimension? (Page 996-7)

9—At what period in the history of the earth did the brontosaurians and pterodactyls live? (Page 998)

10—What is the composition of matter as we know it? (Page 1008)

THE FALLING PLANETOID

By I. R. NATHANSON

(Illustration by Isaacs)

Millions of plunging hits and their immense bursting charges had bitten into the surface of the planetoid, and caused it to be surrounded by a halo of dust and fragments of the body.

THE FALLING PLANETOID

THE world was in a state of consternation, its people consumed with a frenzy of fear. A dreadful calamity, such as had never before been experienced, was threatening to snuff out the lives of incalculable thousands of people and was endangering the very stability of the Earth itself. Stark, fearful tragedy, from which there seemed no escape, confronted the entire globe, for it came from outside the earth's confines, and seemed, therefore, to be beyond the control of man — a strange wandering planetoid was about to fall to the earth!

The meteorites that fell, in these two cases, however, were relatively small. The body which was now about to fall on the earth was fully a hundred miles in diameter, weighed probably quadrillions of tons, and scientists had estimated that it would fall with a velocity of five miles per second. No one could foresee what part of the earth it would strike—hence the widespread terror!

AT least twice in the known history of the earth, there has been a collision with a stellar body of somewhat respectable size. The first, occurring at a date unknown, is supposed to have carved out the gigantic Meteor Crater in Arizona, and the second, which occurred only twenty years ago, destroyed a great forest in Siberia and entirely extinguished a great herd of reindeer.

Both of these bodies were meteorites—space wanderers that were caught by the gravitational attraction of the earth. There is no reason why a larger body, such as a planetoid, should not similarly be caught in the earth's gravitational net and be drawn with terrific speed to the earth's surface. All that would be necessary is that the gravitational attraction of the earth more than balance the centrifugal force of the body's motion.

For each position in space there is a definite speed that a body must maintain in order to keep itself in a fixed orbit near the earth. Any speed smaller than that would cause a gradual but certain fall to the earth's surface.

Mr. Nathanson pictures this condition very vividly and also answers the question as to what humanity could do to avoid such a disaster. Though people may differ on the answer, we are sure they will agree that Mr. Nathanson's is not only convincing but scientifically feasible.

Had this been any ordinary meteorite, it would not have been a matter for such terrible alarm. In the past giant meteorites weighing many tons have been known to strike unpopulated sections of the world, their scarred and pitted masses bearing clear evidence of their extra-terrestrial origin. Small pieces of meteorites may be seen by the interested student in almost every science museum.

In at least two well-known places, one may see the shattering results of the impact caused by a large mass plunging with dreadful velocity deep into the earth. Meteor Crater, near Canyon Diablo, Arizona, is the silent tomb of a giant meteorite that probably went bowling along its course around the sun till, coming within the gravitational grasp of our planet, it was diverted toward us at a terrific speed. The stupendous crash occurred long before the white man settled in the New World. None but the eye of the primitive Indian witnessed the earth-shattering fall. Earth and sky must have been lit up with a blinding glare as the terrific impact cut in the sand and rock a crater 570 feet deep and measuring 3 miles around the rim. In an instant the meteor had displaced more than 200,000,000 tons of rock.

More recently, a like catastrophe occurred in the Yeniseik district of north-central Siberia. On the morning of July 30, 1908, natives saw a fiery body shooting across the sky and heard a violent detonation. As a result a forest area 30 miles in diameter was blown to pieces. The charred and overturned stumps of trees for many miles around bore mute testimony to the presence of some devastating force. An entire herd of reindeer known to have lived in that territory was never seen again, so completely was the center of the devastated area blotted out of existence. Fortunate indeed was it that this fall occurred in a wild, unsettled region. Had it struck some large city or thickly populated territory, the loss of life and property would have been appalling.

I. R. NATHANSON

IT was only a few months since this startling knowledge had exploded the prevailing peace of the world and destroyed its accustomed sense of security. The dreadfully disturbing discovery was made simultaneously by three different observatories in three different lands. There could, therefore, be no question of its authenticity. The most prominent astronomers, mathematicians and other scientists had thoroughly checked the results time and again. There was no way to escape the terrifying conclusion, and at last the entire civilized world was forced to accept it as incontrovertible.

Vast numbers of these planetoids, also known as asteroids, move in elliptical courses around the sun. Nearly all of their ascertained orbits lie between Mars and Jupiter. They vary in their degrees of eccentricity and inclination, and range in size from bodies a few miles in diameter to Ceres, the largest, which has a diameter of 477 miles. Over a thousand of their orbits are known.*

Through some cause which will perhaps always remain unknown, this planetoid which was threatening the world with such dire results had approached too close and had become caught in the earth's gravitational net. It is even probable that it wandered into our solar system from the great beyond. At any rate, its true origin has never been determined. In its journey through space it had approached within 120,000 miles of the earth, and having come within our planet's sphere of control, it was "captured," thus becoming another satellite of the earth and a beautiful addition in our heavens. But it soon became known that our new captive was not a true satellite at all, for it was moving in a highly unstable path, in a gradually decreasing spiral, which pointed to the center of our earth as its ultimate goal. Although it was ambling along around the earth at a leisurely pace—as celestial velocities go—of only about .50 of a mile per second, it was known that a minimum velocity of 0.82 miles per second was necessary to keep it in a permanent orbit. Its momentum, therefore, was not

* One of the smaller asteroids, called Eros, has a very eccentric orbit, and comes within 14,000,000 miles of the earth at its closest approach.

sufficient to keep it going on indefinitely as a satellite of the system. Slowly but surely it was approaching the earth. It was determined that its successive revolutions about our planet would have tipped the balance between the gravitational and centrifugal forces. At the expiration of that period it would commence a dreadful fall toward the Earth with increasingly swift velocity, that would ultimately cause it to crash into us at the frightful speed of five miles a second.

Uncertainty

THE result of such a shock to our globe was paralyzing to contemplate. Many had said that a body of such diameter, if it struck a populous state like New York or Ohio, or a country like England or France, would not only destroy everything within that area, instantaneously snuffing out millions of lives, but would also by its terrific impact pulverize and melt thousands of square miles beyond the immediate point where it fell, shattering and wiping out a great area in an enormously wide circle. The shock at the moment of impact would be so terrific that the whole Earth would feel it as though there had been a thousand earthquakes all rolled into one.

Even though the rest of the world beyond the affected area were spared, such a large body catapulting into the Earth would carve a deep crater thousands of square miles in extent. An eruption of molten matter and deadly gases would follow that might engulf whole continents. Conceivably, it might even cause such a vast explosion as to detonate the Earth and rend our entire planet asunder. Many men of authority stated that the best that could be hoped for was that the collision would occur in a remote part of the land or sea, so that humanity at large would have to bear only the devastating after-shock, which, however, would certainly be felt in every nook and cranny of the planet.

Ironically enough, there was no telling just where the falling body would hit. The celestial mechanics involved were of such a complex nature that accurate predictions were rendered impossible. It was, so to speak, a gigantic lottery of life or death—no city, state or nation could say whether it would be demolished or spared. Therein lay the mental torture! There was no use in trying to evade the enemy, no way to take precautions against the approaching doom. When the final terrifying fall should commence in its accelerating swiftness, there would be no time to flee, nor any place on earth or under its surface in which any man could be sure of safety.

AT first incredulous, humanity passed on to consternation, and then to paralyzing fear. From fear came a dreadful apathy toward all social activities. Stark, unescapable doom stared everyone in the face. To all, from the highest to the lowest, from the humble laborer earning his bread by the sweat of his brow to the princes and potentates of the earth, came the threat of imminent extermination. There could be no choice or selection, no minimizing of the danger. No one knew whose turn it would be; no one could delegate the danger nor buy himself off. Face to face with this inevitable cosmic blow, all stood perfectly equal, in a way to satisfy completely the framers of any democratic constitution or magna charta. There would be no class distinction.

The only mitigating element was the assurance, spread abroad by kindly scientists, that whoever was caught in the direct path of the striking planetoid would never know it; from the vicissitudes and struggles of this life, with its multitudinous cares and tribulations, to everlasting unconsciousness there would be no gradual transition . . . Life would be instantly extinguished.

But just as soldiers become accustomed to the oncoming of screeching shells, so did a terrified humanity gradually become accustomed to the knowledge of the approaching calamity. Resignation and indifference after a while became widespread, bearing witness to the resiliency of the human soul, to man's youthfulness in the world, and to the fact that underneath the surface he is still a splendid savage. "Live while you can" became the common slogan. Let the devil take those wicked ones who are doomed to die, and let the Good Lord embosom the righteous souls who are also doomed to die. What was there that could be done about it anyway? Nothing! And what if a few score millions did die, as seemed inevitable? It was no worse than a great war or pestilence. Such was the reasoning of the more stoical, who, although they had become steeled to the danger, still hoped they would not be of those hapless few score millions.

Then, again, some took solace in the thought that perhaps the menace would strike a deep ocean, or a desert, or other uninhabited area, in which case the principal effect might perhaps be an inundating tidal wave, from which only a relatively small part of the world would suffer; or, at the worst, large numbers of buildings might collapse from a distant but devastating shock. Who knows? So why worry? "Hope springs eternal in the human breast."

Had but true to relate, there were a few misanthropic individuals who drew some wicked comfort from speculating on this most dreadful of lotteries. Some dastardly irreconcilables in Germany, still smarting from the defeat of 1918, hoped that perhaps the falling body would just miss their country on its way to France. And benighted evil-wishers in the latter country, who refused to forget past enmities, opined that a thickly-populated country like Germany was no better than any other—they wouldn't know what struck them, anyway. And communistically minded wretches in "godless Russia" declared openly that they wouldn't shed a tear if Johnny Bull's Island were smeared off the map altogether; while in turn the same wishes were thrice-heaped upon such evil-looking bolsheviks by some resentful Celestials of the good Chinese Republic, as a punishment for taking part of Manchuria away from them.

There were also a few envious people here and there who "hoped not," but, well, if it had to come at all, gruesomely preferred to picture a few square miles destroyed, with Wall Street right in the center. And some cruel spirits there were, who even felt that several score millions more or less of Oriental peoples in this world would soon be made up by them anyway; while, on the other hand, there were equally cruel-minded Orientals who returned the compliments with interest in regard to certain domineering Occidentals. A few fanatics openly preached that it would serve all depraved humanity right; it was going to be a punishment for all its sins, past and present—and assuredly would prevent many from sinning again in the future.

Helpless!

BE that as it may, as historians we may ignore such evil ebullitions of the mind. Wicked-minded mortals there always have been, who, like Haman, might in all probability get what they have wished unto others. Fortunately, a kind providence has made the average man less bad. The milk of human kindness, plus ages of untold suffering, has instilled in his mind and heart a compassionate regard for the suffering of others. And, unless misled, man is more of a builder than a destroyer; more of a lover than a hater—otherwise the world of mankind would not have stumbled along to where it is today.

The world at large was frightened, it is true.

While it was only natural for everyone to hope his particular part of the world would be spared, the average man and woman felt horror-struck, and engaged in an anticipatory sympathy for those unknown unfortunates who were to be annihilated without a chance to escape.

Man in his helplessness turned to prayer. For ages he had done so. Now of all times he needed prayer. In every land, in every clime, among all peoples, prayers were offered in church and mosque and synagogue, and the prayer-presses of China ground ceaselessly. Poor, mortal *Homo sapiens!* In the last analysis, he is as helpless as a creeping ant in the presence of things cosmic!

CHAPTER II

The Conclave

A GREAT conclave of distinguished scientists and statesmen was scheduled to meet at Geneva, Switzerland. The best minds of the world were to gather in solemn session to discuss ways and means to avert the coming calamity, or, at least to investigate its severity. The conclave was called on the initiative of The International Association of Scientists, of which Professor Henri Anders Amiel, of France, was the distinguished president. The greatest leaders in all walks of life were invited to take part in the deliberations.

When the meeting opened, there was gathered under one roof the most brilliant array of men and women in the history of the world. Eminent scientists, great statesmen, practical engineers and inventors, profound mathematicians, labor leaders, financiers and captains of industry, princes and bankers, heads of the church, and others—all met in a great common interest.

Was there a possible way out? Could something be done after all? Questioning minds sought an answer; a clamoring public demanded assurances of relief.

A working body, with the fullest of powers, composed of the greatest astronomers, scientists, inventors, and others whose special knowledge might prove valuable, was appointed by the international congress that was formed. It was to meet continuously, in order to devise, if possible, a means of avoiding the disaster. Every aspect of the problem was turned over to committees of specialists. No stone was to be left unturned. The members of this special body were given assurance of unlimited support, financial and otherwise. A hopeful world looked to these for guidance; if they could work out a saving solution, they would be enshrined in the hearts of their fellow-men forever.

For months these good and able men met and worked indefatigably. They strove with all their might and main and to the best of their ability to arrive at some solution that might offer hope. In vain they planned and figured. In vain they considered the problem from every possible angle. They were forced to admit that they could devise no plan which would meet the dreadful emergency.

Poor mankind! As if any great, saving conceptions of life and achievement could be born that way! As if any great, lasting, revolutionary idea was ever created by a group or groups of men in Congress assembled! The inspiration, the creative genius, the lightning flash of intuition, that would call into being an idea for the solution of such a monumental problem as these men were called upon to solve—this is born of the individual alone! What great idea, what epochal invention, discovery, or solution has ever been contributed by a public gathering, even of the so-called best minds of the time, or in any laboratorial organization, regardless of team work? Improvements—yes: refinements—yes. Accidental by-products—occasionally. New discoveries—very few. A great, epochal idea—seldom, if ever! The great, saving flash of genius does not arrive that way! And talent, no matter how great, is not genius.

THE assembly of scientists continued to meet and persevered in their efforts. They invited the entire world to offer suggestions. Fortune and honor beyond compare awaited him or her who could present the right solution, or any reasonable plan. The various committees were swamped with plans and suggestions which came by the carload from the ends of the earth. Some of the ideas were elaborate, some very simple, some indicated a profound understanding of the intricacies of the problem. Most were not worthy of even a moment's consideration. A number had a semblance of sense, but most were fantastic and at bottom sheer nonsense. And along with many well-meaning but foolish suggestions, there came a good deal of severe criticism, spiced with unwarranted ugly hints of graft, and much contumely and ridicule, as was to be expected.

Many a good and worthy man on these committees smarted under the lash of these ill-conceived missives. They even received sharp reproofs from fatalists and religious fanatics who took them severely to task for meddling with the "ways of the Lord," with "things that are not within the province of man"; and from ignorant writers who demanded to know why it took such a long time to solve the problem.

The great deliberations at Geneva went on, but nothing came of them. And, finally, nobody expected anything to come of them. Hope of a successful solution dwindled daily till it reached the vanishing point. The world resigned itself to its fate, and took refuge in religious devotion.

The greatest ideas are not always conceived in "the greatest minds." Nor is there any general consensus as to what constitutes a "greatest mind." Minds made famous by public acclaim are not necessarily the greatest. The very greatest idea may flash across the firmament of mankind unheralded and unsung, and may long remain unknown to all but him who gives it birth.

In the city of Vienna there lived an obscure engineer by the name of Franz Heinrich Grimm. His birthplace and former home was Essen, Germany; from which city his family moved before the World War. He was a man well past 46, and possessed of an acute mathematical mind. He had been an artillery specialist, and was a profound student of the science of ballistics.* During the great war he had been an engineer in the mammoth Skoda Works, and helped design many of the large howitzers which were used with such destructive effect against the Allies in the earlier phases of the war. After the armistice, when these works were dismantled by the Allies, he continued as an engineer in the greatly shrunken armament industry of Austria. Though poorly paid, it was the only source of livelihood which the impoverished condition of the little nation could offer to a man of his experience and prestige.

Franz Grimm

FRANZ GRIMM was an undersized, puny-looking man, with thin, pinched features, sandy hair, and weak watery eyes behind thick spectacles. He was of quiet, self-effacing demeanor, and gave one the impression of being apologetic for his presumption in living in this world. He had had a very unhappy childhood, full of hardships, and the wretched early years of his life had left a permanent mark on him—physically, at least. But inside his thin

* The science concerned with gunnery and projectiles.

bony body beat a great warm heart; and behind his massive forehead operated a titanic mind, which needed only recognition to produce mighty results.

He had not been invited to the great congress of scientists and others; and if he had been, the chances are he would have lacked sufficient funds of his own to go. Very few knew of him, and still fewer recognised his innate abilities. Even his neighbors and closest friends would have considered it a huge joke had anyone suggested that he be sent to the great gathering in Geneva. And perhaps it was a good thing he was unknown and left out.

Full well he knew the deadly danger which menaced the entire globe. He shrank in shuddering horror at the mere thought of the possible consequences. He had been following closely the deliberations going on at Geneva, yet did not in the least feel that he should have been invited to help—in fact, this did not even occur to him. He was too self-effacing and modest to expect it. Who was he to rub shoulders with those important men? Nevertheless, his soul hummed and burned with the great problem.

As an engineer who had specialised in artillery and the science of ballistics, it was but natural that his mind should endeavor to attack the problem from that angle. For a long time he went about completely self-absorbed and preoccupied, paying little heed to what went on about him, the creative thinker in deep travail. Gradually an idea began to shape itself and to grow within the recesses of his mind. And then, with the lightning flash of intuitive genius, he saw the solution! For days and weeks he labored, with little food and sleep, oblivious to all else. And in the small, scantily-furnished room of his modest home, unknown to the world, he suddenly saw the answer to the problem. Then he fell into a dreamless sleep for twenty-four hours, exhausted but happy.

The working out of the details, though these were many and difficult, calling for the greatest ingenuity, was a mere matter of time and labor. It all resolved itself into a problem of celestial mechanics, and its verification by means of well-known principles of ballistics, applied from the earth with a marvelous force, in a unique way, and on a gigantic scale.

THE problem as Franz Grimm saw it was as follows: The falling planetoid was 105 miles in diameter, a body composed of over three quadrillion cubic yards of matter, whose density was such that its total mass or weight was roughly about ten quadrillion tons—an amount represented by the figure 10 followed by 15 ciphers. It was revolving about the earth at the comparatively low velocity of 0.80 of a mile per second, in an almost circular, yet spiral, orbit whose mean radius was 120,000 miles from the earth. The minimum velocity required for the planetoid to keep in the closed ellipse necessary to the stable orbit of a true satellite was 0.820 of a mile per second. But due to its low speed, which was just a trifle below the point of stability, it was gradually being drawn nearer and nearer to the earth's surface in a slowly decreasing spiral. And it was only a matter of a limited time when the critical point would be reached, when its final fall would commence, its earthward speed accelerating at a faster and faster rate, till it should strike the earth with dreadful force.

If the velocity of the planetoid could be very slightly increased, and the path of its translation about the earth changed into a planetary ellipse while it was still on the almost neutral borderline—"on the fence," as it were—where its centrifugal force almost balanced the pull of the earth, there was still time to cause it to become a permanent satellite of our planet instead of a terrible projectile. The mass of the planetoid, though huge, was after all not of planetary dimensions; and a comparatively small force—as celestial forces go—if properly applied at once would turn the trick; whereas in about four years, when with its present tendency it would have crossed the critical point, no humanly possible force which mankind could apply from our planet would avail, and there could be no escape from the dreadful calamity.

CHAPTER III

Grimm's Plan

WITH the exactness of the mathematical scientist and practical engineer, he drafted a complete set of working drawings of his plan. In brief—not to burden the layman with a highly mathematical mass of technical details—Grimm conceived a marvelously constructed cannon-like engine of unprecedented power, capable of hurling a mass of steel and explosives weighing 50 tons, in the form of a combination shot and rocket, which would leave the mouth of the engine with the enormous velocity of 15 miles a second—more than sufficient to carry it beyond the earth's gravitational recall. This rocket type shot he would charge with a recently devised explosive called *atomite*—the projectile to explode on contact, with unearthly force. To insure absolutely accurate control of the discharge, so that it would find its mark, he also devised a wonderful mechanism which synchronised the varying motions of the earth and the planetoid at the precise second in any point of the sky.

A ring of 50,000 of these mighty firing engines placed around the globe would be necessary to produce the desired effect. As the earth turned on its axis, each cannon, perfectly adjusted and synchronised, would fire obliquely in progressive succession and send the enormous projectiles speeding toward the distant planetoid. The reader may bear in mind the added difficulties involved in the superfine adjusting and timing, when it is remembered that for each shot to be effective it must be fired in an obliquely curving direction and along the planetoid's orbit, in order that the superior velocity of the projectiles might exert the proper push in the right direction. The effect of an individual impact and explosion of each shot as it would overtake and plunge into the planetoid along the line of its motion, though extremely powerful, would still be imperceptibly small on a body 105 miles in diameter; but a ceaseless stream of such missiles properly directed simultaneously would have their cumulative effect in gradually accelerating the velocity of its orbital translation and, what might be more important, in gradually shattering the mass. For if the planetoid could be broken up, the chances of serious damage would be decreased mathematically. Perhaps the body could even be blown into small fragments, if it could be kept in the sky long enough. But once the velocity of the planetoid were pushed above the critical point, the planetoid would forever become a harmless [illegible].

When Franz Grimm had his plans and specifications complete down to the last figure, he sent them to the congress of scientists which was still at grips with the problem. In a modestly worded letter which he included, he apologised profusely for his inability, on account of lack of funds, to come to Geneva personally to describe his plans.

Though the august body of men deliberating in Geneva had been voted liberal funds by the international assembly, they had too many suggestions in their daily mail to consider seriously paying the traveling expenses of everyone who offered to come and explain personally some pet scheme. The plans and exactly worded specifications which Grimm sent should have caught any expert's attention im-

mediately as worthy of closer study. But as the overworked staff of secretaries could not all be sufficiently intelligent and selective, a full month went by before his precious package received the proper attention; and it might have been delayed still longer had it not been for a sharp-eyed young scientist who came across it while searching for something else.

IT did not take long for the trained minds of those who examined Grimm's plans to realize that here was something decidedly different—an arc-light in the dark! Funds were immediately wired to the impoverished engineer, with orders to come to Geneva at once.

He was dreadfully embarrassed and self-conscious throughout the meeting. His face was flushed; he was nervous and spoke in a timid and constrained voice. But his clear and beautiful drawings, his demonstrations, and the long lists of exact and carefully worked out (though complicated) mathematical equations spoke for him in thunderous accents. Like so many of the most important inventions, its principles were at bottom quite simple. Within a few weeks his entire plans and figures were unanimously adopted. A full-size working model of one of the engines and a quantity of the powerful explosive, together with the special range-finding equipment, was immediately to be prepared and given an actual test. And throughout an anxious world the glad news was announced, that at last a definite practical plan had been evolved.

All that was necessary was its actual execution; and for this there would be required the sum of 400 billions of dollars.

The enormous tension was eased; a gloomy world became light-hearted! The day of the joyful announcement became an impromptu holiday, given over to laughter and merry-making. Everyone went back to work happy, and the terrible tension was visibly relieved.

Overnight Franz Grimm became an international idol. His shrinking, modest soul was now overwhelmed by the acclaim of a whole world. Where before he had eaten his simple food and lived in humble quarters and pressed his own shiny trousers, with nobody caring whether he missed a meal or a dozen meals, he now became the object of solicitous attention on all sides. He was wined and dined; he was constantly interviewed; his every move and step were clicked off by numerous cameras and became a matter of world interest. Many marvelous, godlike qualities, as well as stories of significant events in his life were reported and gained circulation—things he himself never knew of! The poor man couldn't understand it all; he wasn't any different from before. Hair for hair and cell for cell he was the same being. Why all this fuss? He was overwhelmed and by no means pleased with the world's adulation and hero-worship.

Another Congress

THEN through the various news channels the public began to be apprised of the immense taxes that would have to be raised. People ceased their smiling and shook their heads dubiously. In the general rejoicing nobody had given any thought to the stupendous cost. The public was reminded that oftentimes in history the winning of great causes had meant mountains of gold and rivers of blood; but this time it meant mountains of gold only. When everyone at last realized the drain that the expenditure would make on his money, the general ardor began to cool. Perhaps it wasn't the best plan after all? What assurance was there it would prove efficacious?

For many priceless months, even though faced with unthinkable tragedy, the press and the public bickered and argued pro and con. The world was overridden with taxes as it was, and such an increase as would be required was decidedly unpleasant to envisage. But, said the wise men, regardless of any criticisms and wishes to the contrary, there was no other way out; here was a saving plan—take it or leave it.

Then came a loud call from many quarters for immediate action regardless of cost. The steel manufacturers and power companies and makers of explosives could see no reason for dilly-dallying, and wholeheartedly endorsed the vast project. On the other hand, many were in favor of it, of course, but were against such enormous taxes—unless the money came from other sources than their own. And there were some loud-mouthed skeptics and critics who did not believe in the undertaking anyway. "It sounds too much like attempting to shoot the sky full of holes and going bankrupt in the bargain," as one popular journalist put it. There were even those who did not believe there was such a thing as the alleged falling planetoid at all—at least it looked harmless enough in the night skies. Perhaps the astronomers were mistaken!

But the astronomers were implacable in their constant and fearful prodding of the public. People were continually reminded in well-painted word pictures what such a crash would mean. And the never-failing accuracy of their predictions in the past generation had bred a wholesome respect for the exactness of their science.

An international congress extraordinary, attended by plenipotentiaries of the nations, with full power to draw up a tentative agreement, met in Washington. A definite understanding as to the share each nation should shoulder was to be discussed. Then commenced more interminable arguments and bargaining. Each delegation sought to prove their utter inability to pay beyond a certain amount. To judge from the newspaper accounts of the proceedings of these worthy men, one would have believed that nearly all the nations of the world would have to go into bankruptcy in order to buy their salvation. Reports and counter reports of financial experts on the amount of the ability to pay followed one another. No one would have believed there were so many indigent peoples on earth. And even though a satisfactory agreement were to come out of the congress, the delegates must then enlist the support of their peoples. Naturally each delegate with his ear to the ground and his eye to the future tried to make his nation's share as low as possible.

HOW long this bickering would have gone on nobody knows. Washington was a delightful place to be in—it was just at the beginning of the social season. But the scientific world at last made it plain in terms no layman could fail to understand, that the zero hour had come; that unless actual work began immediately, all efforts would be futile. As it was, the resources of the entire globe would be strained to the utmost to complete the enormous undertaking within the minimum required time. There was not a day to spare.

A peremptory demand from the people at large, whose minds had begun to border on terror, settled the whole thing in a hurry. Ugly riots and ominous demonstrations occurred simultaneously in many cities of the world. It was evident that by further delay the public spirit would become demoralized, with who knows what frightful results. The statesmen and financiers came to a quick agreement, which the governments at home dared not refuse to ratify.

An international body was formed with headquarters in Geneva to direct the stupendous undertaking, with full power to carry it to a successful conclusion. There could

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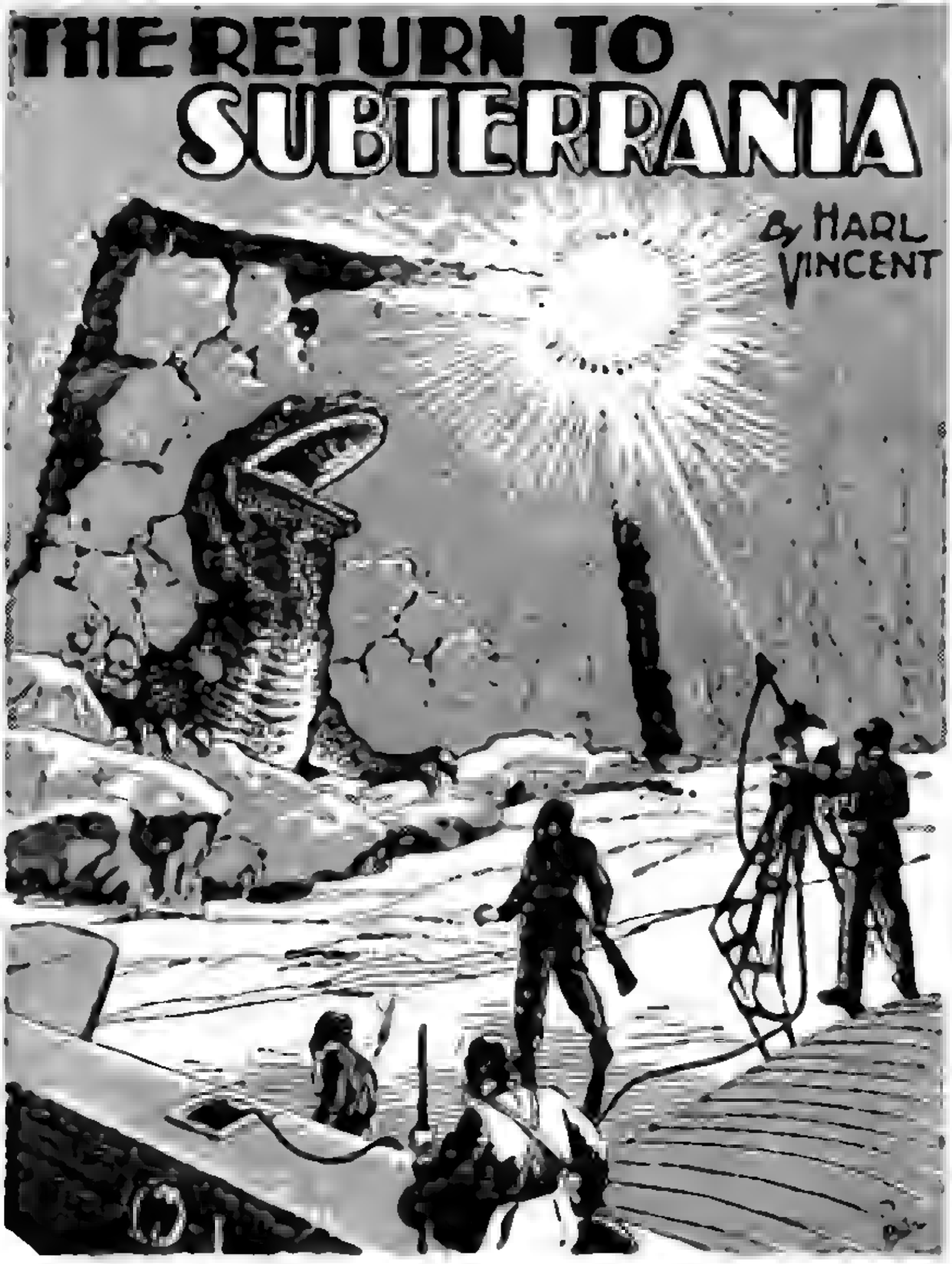
THE RETURN TO SUBTERRANIA

By HARL VINCENT



(Illustration by Paul)

Then suddenly there came a terrific roar. The earth shook as thousands of tons of rock crashed into the passage sealing it forever.

THE RETURN TO SUBTERRANIA

By the Author of "Menace From Below," "Before the Asteroids," "Yellow Air Peril," etc.

INTO the New York office of Platt and Frazee, Consulting Engineers, walked Anthony Russell on an unusually warm and humid day in the last week in August, 1935. Tony was lugging an awkward package, and he paused to remove his hat and mop his brow when he stopped at the information desk.

"Are the big bosses in?" he asked of the red-haired girl who was stationed at the telephone switchboard.

"Oh, hello, Mr. Russell," she said, looking up startled from the paper-backed book she was reading. "Yeah, they're in. But, they've been in the conference room for about a half an hour."

"Just give them a buzz and tell them I'm here, will you?"

"Sure thing, Mr. Russell." And the girl languidly made the connection and announced the visitor.

"Send him right in," came the instant reply in Ward Platt's hearty voice.

The girl made a wry grimace and moved the receiver from her ear. "Hear that?" she asked, "Nearly busted my ear drum, he yelled so loud."

"Yes, I heard," laughed Tony. And he hurried through the door to the inner office.

"Hello, Tony," called Ward Platt, when the visitor stepped into the conference room, "Where in the world have you been keeping yourself? We haven't seen you in weeks."

He grasped the hand of the young president of the Russell Television Corporation in a grip of iron. His junior partner, Charlie Frazee, rose to greet Tony like a long lost brother.

"Yes, you old hermit," said Charlie, "between your devotion to the new bride and this invention of yours we hardly know you are living any more."

"Well," said Tony, "Margaret comes first, of course. And it is true that I spend every possible moment in her company. But I think I have hit upon something here that will interest you both. It was worth the time spent on it."

He tapped the large package meaningly.

"Open it up, man. Open it up," said the senior partner of the firm of Platt and Frazee, "Don't be so confoundly secretive about it. We don't steal inventions—not in this office."

Charlie laughed at his partner's impatience. "Don't mind him, Tony," he chuckled, "He has a grouch because the papers have been razzing us again about the old subway mystery. Has your invention anything to do with that?"

"It has," replied Tony solemnly.

And Ward Platt ceased his nervous fidgeting as their visitor commenced removing the wrappings from his package. "Really?" he inquired, "Can it, by any chance be used in substantiating our story of the menace from below?"

IN this story, the sequel to Mr. Vincent's remarkable "Menace from Below," we have some further adventures in that underground cavern, Subterrania.

Scientists are agreed that during the period of the earth's cooling, a great bubble might have formed beneath its surface. It is quite likely also, if access could be had to this cavern from the surface, that during the eons of time, when the earth passed through its ice ages, many strange animals might have come to Subterrania for protection against the bitter cold. In this case, we would have preserved many of the species that perished on the surface hundreds of thousands of years ago.

It is quite possible too, that the conditions in this underground world might be such, that life could endure there indefinitely. The requisites for the sustenance of life—a kind of sunlight, heat, moisture and plenty of vegetation—are all possible.

We commend the story to our readers heartily, as a fitting sequel to the "Menace from Below."

"I BELIEVE so, Ward. And that is the reason I have buried myself in the work on the darn thing. It makes me sore the way the public received the news of the doings in Subterrania. Why, dammit, they had enough evidence from those first few glimpses in the television screens when the second subway train was spirited away from the Clark Street tunnel and removed to the cavern beneath by means of Jerry Talbot's fourth dimensional process. Numbers of operators and reporters saw the ape-men in the viewing screen, and later, when the militia entered the cavern and the explosion took place there was certainly plenty of evidence."

"Yes, but they refuse to swallow the tale of the psycho-transference process," said Platt drily, "and Charlie and I have lost a lot of business because he sticks to the story. Imagine a member of a conservative engineering organization like ours swearing that Ainsworth and Talbot stole the brains from the hundreds of people who were kidnapped in the subway train disappearance, and transferred the brains to the crania of some giant supermen evolved from the Pithies or ape-men by those same two scientists! The public simply will not believe it. Charlie had to resign from the A. S. M. E. the other day."

"Oh, that's tough, Charlie," commented Tony, "I'm sorry to hear it." Gleaming portions of the mechanism he was unwrapping now came to view.

"I should worry," said Charlie carelessly, "the members are getting to be a bunch of old fogies anyway. And I have a sharp pain every time I visit the meetings."

Russell's package was entirely unwrapped and he placed on the table a shining mechanism that incorporated an ordinary television screen, a small dynamic loud-speaker, and two curiously constructed helmets with flexible wires and plugs attached. The main portion of the apparatus included an elaborate tuning and beam-direction system and contained more vacuum tubes than Platt and Frazee had even seen in one assembly.

"What's it for?" asked Charlie.

"Remember the circular viewing screen they had in the castle down there in Olaka, the city by the great underground lake?"

"Yes, indeed. You mean the one in which Ainsworth watched the invasion of the cavern under the subway tunnel?"

"Yes," Tony agreed, "I was curious about that screen,

because I was sure there was no television transmitter in the cavern. If there had been, it must surely have been demolished by the explosion. So I examined the mechanism of the circular screen and found that it operated by means of rays of etheric vibrations projected to the point to be viewed, these rays conveying the light impulses that were utilized in the apparatus to produce the images we viewed. And I went them one better. I can not only view distant scenes without the use of interconnecting wires or a transmitter of any sort at the point under observation—I can hear sounds produced there—hear the voices of humans that may appear in the scene."

"Wha-a-at?" chimed Ward and Charlie.

"I'm not joking. And, what's more, I believe—though I'm not absolutely certain, as yet—that I can transmit thoughts to beings in the distant scene and get their replies by means of the sound mechanism."

"Then," said Charlie, "by George, we should be able to prove our story. We can reproduce scenes in Subterrania on this screen if what you say is true. We can allow the skeptical public to listen to the gruntings and howlings of the Pithies and Grimaldi; let them hear the perfect English spoken by the supermen to whom the brains of the poor captives were transferred. Oh boy! It'll clear us both, Tony!"

"I'm sure of that. But that is not what I'm particularly interested in at the moment. That's not the reason I brought the machine here."

"What is the reason, if I may ask?" inquired Ward.

Tony was busy making some connections between the various parts of his apparatus, but he straightened from his task to face his two friends. "It is merely this," he replied soberly, "I have tested this machine myself and have learned an astonishing thing. Jerry Talbot is still alive down there in Olaka!"

Charlie paled. "Now I know you are kidding," he whispered, without confidence.

"I was never more serious in my life." Tony spoke gravely. "I have seen him in this very screen; have heard his voice. And I endeavored to get a thought message through to him and partially succeeded, for I received the distinct impression that he suddenly felt the efforts of my mind; that he wanted to communicate with me."

"Good Lord!" exclaimed Ward, "It sounds like a fairy tale."

"It isn't, though," replied Tony, who was manipulating the dials on his latest scientific achievement. Then, "Where's your base plug?" he asked.

Charlie indicated its location and Tony plugged in the heavy cable that led to the main portion of the apparatus.

Ward and Charlie exchanged wondering glances as the television wizard closed the switch that lighted his tubes.

The Message from Below

THERE came the faint hum of a small motor from somewhere in the apparatus and tiny pin-points of light showed that the tubes were functioning. The screen lighted and the loud speaker broke the silence as a view of Tony's laboratory appeared. On a workbench pictured in the screen there showed a mechanism quite like the one before them and one of the workmen was operating it.

"All right, Ed," spoke Tony into the microphone, "adjust the exploring ray to the direction in which we were operating last. I will then take control here."

"Okay, Chief."

They observed that the operator made careful settings of two levers which operated over finely graduated quadrants—then his features and the laboratory faded from view.

"Two beams are required," explained Tony, "and these are set to converge at the point to be observed. There is a return circuit through the ether between the two mechanisms, this return circuit forming the base of a huge triangle whose apex is now in Talbot's room in the castle of Olaka. Watch closely now."

Slowly the screen came to full brilliancy and they saw pictured on its surface the interior of a combined living room and library. At the far end there was an alcove, through the door of which could be seen a high, canopied bed. The visible walls of the room were lined with rows and rows of books on shelves, and, in the foreground, there was a glass-topped desk on which was spread a mass of papers. A slide-rule had been laid across a pad of paper on which there was a mass of calculations, and, so accurate was the definition of the screen, they could make out some of the figures which were written in a careful painstaking hand. On the wall back of the desk, there was a large map of Subterrania. But Talbot was not in sight.

"Guess we'll have to wait until he shows up," said Tony.

He adjusted one of the helmets on Charlie's head and then donned the other himself, explaining that better results would likely be obtained by the combined thought concentration of the two men known best by Talbot. These helmets were of flexible wire mesh and had metal electrodes that pressed against both temples and the base of the wearer's skull at the back of the head. They strapped under the chin, but were cut away so as to leave the ears, eyes, and mouth exposed, so as not to interfere with hearing, sight, or speech. Tony plugged the cables into jacks that were provided in one of the bakelite panels of his apparatus.

They had not long to wait, and Charlie experienced a distinct thrill when Talbot rushed into the room that was pictured in the screen of Tony's marvelous instrument. The erstwhile partner of the late Ainsworth was greatly agitated and his features were drawn and haggard. He had lost much weight since they last saw him.

"CONCENTRATE now, Charlie," said Tony, "Bend every effort of your will to command that Talbot speak to us; utter his thoughts. We can not read his mind by means of this apparatus, but the loud speaker will bring his voice to us. And I have every reason to believe that our minds can control his actions. Think—think hard now!"

Talbot had hesitated before his desk; looked around the room as if expecting a visitor. "It's here again," he muttered, "The presence of someone—I feel it in the atmosphere of the room. Am I losing my mind? And now it seems that there is someone else here. What does it mean?"

"He's getting it, Charlie," gloated Tony, "Keep up the concentration!"

And Charlie Frasee closed his eyes and furrowed his brows in the most intense effort of will he had ever exercised. Talbot sat suddenly in his swivel chair and swung around so that he faced them in the screen. It seemed that he looked directly into their eyes.

"I know! I know!" he exclaimed, "It comes to me clearly now. Those two are using some telepathic means of getting in touch with me. They are asking me to reply; to give them the message I have wanted to send—and, in speech, they seem to demand."

Ward Platt watched his two friends in astonishment. Great beads of perspiration stood on their foreheads, for the effort was tremendous. But Tony's invention was a success. There on the screen Talbot flung his arms wide in a gesture of supplication. "I understand now. Tony—Charlie, help me," he begged. "Come to me! Assist me in righting some of the wrongs I've done. I have been planning to get a message to you to tell you this."

He paused in a listening attitude, his distressed features twisted in an agony of misgiving. Charlie and Tony bent their wills to the task of bidding him to continue. Then Talbot smiled.

"Ah!" he exclaimed in a relieved voice, "you have heard me! Your message is distinct. I shall continue my story and leave the decision in your hands. Four months ago, at my bidding, you left me for dead. I was seriously wounded in the encounter with our manufactured supermen. Subterrania was a dangerous place for humans, so I got you two and Margaret Van Alstyne to the surface. I have never regretted this action on my part and I hope that happiness has come to Tony and Margaret.

"A higher power must have desired that I be spared for some work of mercy, for I recovered from wounds that should have been fatal. And now I am alone in Subterrania, the sole human being with normal faculties. But to those sub-men—the Pithies and Grimaldi—I am still a god. They have cared for me tenderly. And the supermen and the morons we created have left the castle and have taken up their abode on the other side of the lake.

"AFTER you left me in the castle I locked myself in my own rooms to die. Then I swooned and must have remained for many days in that condition. When I awoke I was burning with fever and I staggered from the room to end my sufferings in one final battle with the monstrosities created by Ainsworth and myself. But they were gone. Not a single one of the supermen nor of the morons remained in the castle. So I called a few of the Grimaldi from the town, and, with their help, succeeded in cauterizing my wounds and administering medicines to myself for the fever and the anemia caused by loss of blood. I was confined to my bed for about six weeks and the ape men waited on me hand and foot, dosing me in accordance with my directions.

"When I was able to be up and about, I discovered a remarkable thing. The encampment of the supermen and morons across the lake was a scene of perfect harmony. Evidently the first enmity had evaporated. They discovered they were kin, at least in the matter of the purloined brains. But they would permit none of the Pithies or Grimaldi to approach their village. And, as for me, I dare not show myself to them for fear the terrible warfare will again break out.

"As near as I am able to judge, there are about five hundred of them remaining. Half of these are our supermen and women with the stolen brains, the remainder being earth folk from whom those brains were taken. I believe I can save those pitiful human beings and restore their normal faculties. But I can not do it alone. I must have help, and I can think of no persons other than yourselves on whom I might call. Will you come?"

"Good God!" exclaimed Tony, "this is of far greater importance than the opinion of our neighbors. We'll help return some of the victims to their families! Charlie! Charlie! Help me tell him we'll come!"

Once more the two men concentrated on the thought to be conveyed. And Jerry Talbot waited with fearful expectancy written large on his emaciated features. Then he smiled quickly, joyfully.

"Thank you," he said simply. "Make your preparations at once, and I shall send for you by the fourth-dimensional process. At eight o'clock this evening by your time I shall turn on the power. For the location—let me see—suppose you meet at the first tee at Van Cortlandt Park golf course. It will be deserted at that hour and an ideal spot for the purpose. I'll locate you in the screen you saw in our laboratory here."

He waved his hand happily and rushed from the room, leaving the three listeners lost in thought. Tony and Charlie removed their helmets and sighed their relief.

"Well, I'll be dog-goned!" exploded Ward Platt.

CHAPTER II

Tony Breaks the News

"HELLO Margaret!" Tony called out, as soon as he had opened the door of his small Park Avenue apartment.

"Oh Tony!" There was the patter of hurrying little feet, and his bride of two months was in his arms.

"Home early, aren't you, dear?" Margaret disengaged herself and watched her husband as he tossed his hat on a small table and strangely avoided her eyes. "I'm so glad, Tony, but what's wrong? You look like a cat who has eaten the canary. Tell mamma, now."

Tony laughed and hugged her again. "It's about Subterrania, Margaret," he said, "and I hesitated to tell you, for it means that I must return to Olaka."

"Return?" His wife gasped and paled with horror. "But Tony. Why? Talbot is dead—and—"

"Talbot is alive. He has communicated with Charlie and me. We must go to him."

"But why?—why?" Margaret's voice rose hysterically. She had thought that terrible page in their life's book was forever obliterated.

"Because, dear, there are about two hundred and fifty of our fellowmen still within the confines of that sub-surface realm, and there is a chance of restoring them to their senses and to their families. Talbot has experienced a complete change of heart and is bent on repairing as much as possible the damage he has done. He needs our help and Charlie agrees that on behalf of humanity we must give it."

"Charlie! He hasn't any wife to leave behind. He has no one but himself. Oh, Tony, Tony—don't go! You'll be killed!" She was pleading desperately now.

"I'm sorry, dear. But, can't you see? I've simply got to go. Remember Gorth—the giant who died at our feet? Remember his bewilderment at his unaccustomed thoughts; the heartaches that were transferred to him with the mind of the hapless man who had been torn from his home and family? Remember the morons, those victims of the subway disaster whose minds were stolen and transferred to the monsters that Ainsworth and Talbot developed from the ape-men of Subterrania? Remember the little fellow in the hospital who looked at us so pleadingly? He looked like a whipped cur."

"Stop, Tony, stop. Oh, it was terrible! They must be saved if it is possible. But I'll not let you go alone. I'll go with you."

TONY had not counted on this and for a moment he was nonplussed. Margaret return to that dreadful place? Never!

"Now listen, dear," he begged. "It's damp and unhealthy down there and besides we are to be taken by Talbot's fourth-dimensional method. I wouldn't have you subjected to that for anything. Not on your life! Besides, I'm not going alone. Charlie's going too."

"Then why can't I go? It's no worse for me than for you."

Tony floundered in desperation. "There's no danger, dear," he said. "At least there is peace among the natives down there now. Honestly, honey, there's not the slightest danger and you needn't worry about me at all. Just a little scientific expedition, nothing more."

He realized that he was getting in deeper, for the more he tried to convince her of the harmless nature of the trip, the more she would insist on accompanying him.

Then the telephone bell rang, and he drew a breath of relief. It was at least a temporary respite. He rushed to the telephone as to a staunch defender.

"Hello! Oh, hello, Ward," he said, the receiver pressed to his ear. "What? You're going with us? That's great! Margaret? Yes, she's here. Mary wants her to stay at your place while we're gone? Oh, that's better than ever. I'm sure she'll be pleased. All right, at eight o'clock then; we'll be there. I'll stop for you at seven-fifteen. Yes, just a minute, here's Margaret now."

He handed the telephone to his twinkling-eyed bride and beat a hasty retreat to his own den, where he executed a few steps of the hornpipe.

"Good old Ward!" he chortled. "That fixes everything. And, by George, I'll be glad to have him along. He'll be a fine stabilizer for Charlie and me."

A little later Margaret slipped into the den and looked at him with amused accusation in her dewy eyes. "You old schemer, you," she laughed, "you put Ward Platt up to that, didn't you?"

"No—no. Honestly now, I didn't. But I'm glad it turned out the way it did. My mind will be at ease about you now."

"But how about mine?"

"Pooh! You needn't worry about me."

"I will, though." Margaret fell silent.

"Nearly had our first quarrel, didn't we?" commented Tony, irrelevantly.

"Of course not, you old stupid. But, after all, you know—I have had you but a short time—and—"

Suddenly Margaret was on the arm of his chair, her head on his shoulder. Quarrel indeed!

The First Tee

PROMPTLY at seven o'clock, Tony's town car cut through Central Park and headed for the Seventy-second Street exit on the west side. Margaret was with him, and the chauffeur observed in his rear-view mirror that they were sitting together very closely. In an unbelievably short time they had crossed town and turned the corner of Riverside Drive. The car drew up at the curb and they rushed into the entrance of Ward Platt's apartment house at exactly ten minutes past seven.

The farewells were short and breathless, the two wives clinging to their husbands while Charlie Frasee begged them to hurry. It was eighteen minutes past seven when they clambered into the car and Tony gave the driver their destination. From the look returned by the liveried mechanic it was evident that he thought his employer and his friends were bereft of their senses. A public golf course at eight o'clock in the evening! Bootleg hooch, they must have been drinking!

But the heavy car moved smoothly and swiftly up the Drive, for the northbound traffic was light at this hour. And there was time to spare when they turned off Broadway and into the park at the Two Hundred and Forty-second Street station of the old West Side subway. It was quite dark now and there were few loiterers along the road. They passed under the railroad bridge and beyond the still lighted club-house where a few late golfers remained arguing over their scores. There was no moon and they could barely make out the lake shore when the car pulled up at the gate of the course. A park policeman eyed them suspiciously when they left the car and the chauffeur, who had been ordered to keep mum, drove it away.

They crawled under the fence and Tony lighted a match so that he could see the face of his watch. It lacked five minutes of eight o'clock.

The three men walked to the much trampled tee and took their stand on its uneven surface, feeling guilty and foolish. A steady stream of automobiles passed along the adjoining main road, and the headlights of an occasional car that turned in from the side road shone full in their [illegible]

"Hey you!" called a strident voice from the shadows near the gate, "what are you doin' in there?"

"Now we're in for it!" whispered Charlie hoarsely. "It's the cop!"

"Come on out o' there!" roared the authoritative voice, "or I'll shoot. You ain't allowed in there after dark!"

A crowd was gathering and a number of automobiles had pulled up at the curb, their curiosity-impelled occupants scenting excitement.

"What can we do?" groaned Ward Platt, picturing in his mind an ignominious end to the adventure.

"Sh-h-h!" hissed Tony. "Time's up."

"Hey!" called the officer, who was now advancing in their direction. "Didn't I—?"

But his voice was drowned in a shuddering roar from beneath their feet. The gathering thrill-seekers fell back in confused alarm as a huge ball of orange fire surrounded the three men on the tee, lighting the scene brilliantly for a fraction of a second. The very space about them seemed to be twisted and strained. An utter silence followed.

Then, "Holy mother!" exclaimed the officer, "they're gone. It's the work of the devil himself!"

And once more the metropolitan press was supplied with a front page mystery.

In Subterrania

"WELCOME gentlemen," smiled Jerry Talbot.

The three visitors from the surface world, somewhat dazed and shaken, stood before him in the laboratory of his underground castle. To Tony and Charlie the scene was familiar, but Ward Platt looked around him in [illegible]

"Hello, Jerry," said Tony kindly. Talbot appeared to be in an advanced stage of tuberculosis.

Charlie was likewise greatly taken back by the change in the scientist who had once dreamed of ruling the world. Ward Platt would scarcely have recognized him, having met him but once, and that nearly ten years before. There was a solemn silence as the three visitors shook hands with their host, who had suddenly become reservedly shy. This was not the Jerry Talbot of old.

"Thank you, gentlemen," he said finally, in unaffected simplicity, "not for myself, but for these poor creatures whose pitiful plight is the result of the madness that once possessed me—and my late partner, of course. I am doubly grateful to Mr. Platt, for I had not dared hope that he would accompany you."

Charlie and Tony exchanged wondering glances. Certainly, Talbot had changed!

"Glad to be here, Talbot," said Ward heartily, "for a number of reasons. And first off, I want to know how we got here. Of course, Tony has told me of this fourth dimension thing but he doesn't really understand it himself, though he saw the process in operation a number of times."

"It's not simple, Mr. Platt," replied Jerry, "but I'll do my best to explain."

He turned to a near-by drawing table and commenced a rough sketch. Tony and Charlie watched as closely as did Ward.

"The so-called fourth dimension," said Jerry, "is not really a dimension. It is an interval; the time-space relationship academically discussed by Einstein. We may have length, breadth and thickness, yet we can not exist without that fourth dimension. It is the medium by which

we perceive the existence of matter. Were the interval of infinitesimal duration we should not be aware of existence; if of infinite duration, that existence would be forever. In the universe any two objects physically separated are said to lie at a definite distance apart, this being measured in inches or miles or light-years. This is the dimension we term length."

HE drew a circle on the paper before him and indicated a point at some little distance inside its circumference.

"Now, just imagine," he continued, "that this circle represents our earth. This point is our location in Subterrania, approximately eight hundred miles from that first tee at Van Cortlandt, measured i none of the ordinary dimensions. But, in the fourth dimension, the distance or interval is but a small fraction of a second in time, assuming the normal velocity and direction of light as the measure of the time-space interval of those two points. Of course, to remote points in the universe the interval is a huge curve. Straight lines are then no longer straight, whether we consider them in the fourth or in one of the three customary dimensions. But in the case of so small an interval as that through which you just passed, the problem is comparatively simple. By the use of a ray or beam of ultra-rapid vibrations between the two points, your three-dimensional existence was momentarily suspended. The fourth dimension was then compressed, by the slight amount necessary to bridge the interval, much as we would compress an elastic object in one of its physical dimensions. This all occurred in the space between two heart-beats, so that, with your three-dimensional entity immediately restored—why—here you are. Do you understand?"

"Jerusalem! No!" said Ward Platt. "Here—let me get this thing straight!" And he sat down beside Jerry, taking the pencil from his hand and starting to draw a tesseract.

Charlie dropped his eyelid in a significant wink when Tony grinned at him over the bent shoulders of the two men. The two younger men withdrew from earshot of the absorbed scientists.

"Ward's in his glory," laughed Charlie. "He dotes on the deep stuff. He'll have it figured out before the night is over. But it's beyond my depth."

"Mine too," agreed Tony. "My research has all been along practical lines. Involved mathematics give me a pain. Suppose we look around the old place a bit while the two professors are doing the brain work."

"Right-oh!"

And the two friends stole quietly from the laboratory to prowl around in the castle from which they had escaped so opportunely a few months ago.

CHAPTER III

Unexpected Visitors

AS far as they could determine from a casual inspection of the halls, their old rooms, and the hospital wards and operating rooms, nothing had changed since their first visit to Subterrania. As was always the case, the entire castle was illuminated within by the artificial daylight which had been developed by Ainsworth and Talbot. Occasionally they came upon a Pithie or one of the Grimaldi, engaged solemnly in some household task that was performed with mechanical precision. For the ape-like creatures could imitate marvelously although they could not originate any new action.

"Shall we take a look outside?" asked Tony, when they had tired of their tour of inspection.

"Let's," said Charlie. "You know I was locked up most of the time when we were here before and consequently did not see much of the outside. I haven't even seen the streets of Olaka from close by, you'll remember."

So they proceeded to the lift and were quickly carried to the main hall, from which they emerged upon the broad, paved area that fronted the building. Before them spread the tideless waters of Lake Ataka and high overhead there shone the cold light of the five underground suns, those great patches of phosphorescence set in the eighty-mile-high arch that separated Subterrania from the upper world. They left behind them the tall building that was the monument to the ingenuity of Talbot and Ainsworth, and the tomb of their ambitions. They passed along the broad roadway which was lined with orderly rows of the circular huts of the natives, dome-shaped and uniform in construction.

"Do you know," said Tony, as they walked slowly through the deserted street, "it is still a mystery to me why these ape-men have not been developed mentally by education rather than by the psycho-transference operations?"

"Too slow for those two crazy scientists. They had more than a half million years of evolution to duplicate in a matter of months. Lord, but Talbot has changed!"

"Hasn't he? Poor devil! I can't help pitying him. He has plenty on his conscience and I really believe that old Ainsworth had him hypnotized into doing the things he did."

"So do I, Tony. He seems to be genuinely sorry and to want to repair the damage as much as he can. He's a sick man, too."

"You said it. T. B., if I know anything about it. And no wonder. I believe he had a bullet through the lung when we left before. How he ever recovered is beyond me."

It was the sleeping period of the natives, so they encountered not a single one of the Pithies or Grimaldi. Their quintuple shadows etched grotesque patterns against the flag stones and huts as they passed.

THEN, with startling suddenness, there came an eerie whistle from over the lake, and a pteranur, one of those great batlike creatures of the Mesozoic era with a twenty-foot wing spread, flapped swiftly by over their heads. Charlie gasped when he saw the weird flying lizard, but Tony laughed, for he had seen one during his first visit. Then his laugh froze on his lips. From the direction of the lake there came a perfect bedlam of whistlings, and dozens, in fact hundreds, of the huge creatures went screeching by, some flying so low that their beating wings brushed the tops of the huts and came perilously close to the two adventurers. A single blow from one of those huge wings would have crushed either of them flat.

"Holy smoke!" exclaimed Tony, when these nightmare denizens of the sub-surface realm had winged their way into the distance. "It must be that something frightened them. Wonder what it was?"

His answer came in a bellowing screech from the direction of the lake, a deep-throated, penetrating howl that sent shivers of apprehension chasing down their spines. Then, as if by magic, the street was filled with chattering, scurrying ape-men.

"Look! For God's sake, look!" shouted Charlie, pointing over the low huts toward the lake.

And the two men stood frozen with horror as a great, scaly head with basilisk eyes looked out over the scene. The head waved from side to side and its tapering column of neck seemed to be of endless length as it rose higher above the outlying huts. Then there appeared the giant shoulders and massive trunk of an enormous creature which raised itself to a height of more than fifty feet, with forelegs dangling as it braced itself with the still more massive hind legs and its powerful tail.

"A brontosaurus, Charlie! Run for your life! And Tony led the way in a rapid sprint for the castle.

The city was in an indescribable uproar. The ape-men screamed and fought in their efforts to reach safety, filling the streets with hideous sounds as they milled about in their panic. Another and another of the huge saurians rose dripping from the black waters and advanced deliberately into the city, crushing the huts like so much papier maché beneath their ponderous feet. Gasping for breath, Tony and Charlie reached the castle and stumbled inside, bolting the great double doors behind them.

In Desperate Straits

WHEN they reached the lift they found it already in motion, descending from one of the upper floors. It came to a stop at the main hall, and Ward and Jerry dashed from the cage.

"What is it?" asked Jerry, startled out of his usual composure.

"Antediluvian monsters!" gasped Tony. "Brontosaurians—three of them!"

"What?" exclaimed Ward Platt incredulously.

"It's a fact, Ward," Charlie declared, "they're wrecking the city of the ape-men at this moment."

And indeed, from the noises without, it seemed that this was the case. Terrifying bellows came from the enraged saurians and muffled crashes told of the demolition of many of the stone-and-concrete huts of the natives.

"I have feared this for several years," said Jerry, "though these huge reptiles have never before visited the main cavern. It is many miles from their abode, which Ainsworth and I sealed off from the rest of Subterrania when we first discovered them. But I have always had doubts as to the sufficiency of the concrete barrier we erected. Now the beasts are upon us."

"What shall we do?" asked Tony.

"No use to venture against them with rifles." Jerry pondered the problem, evidencing his concern by the frown of perplexity which furrowed his brow. "The one vulnerable portion of these creatures' anatomy is the brain, and this occupies a space of no greater volume than eight cubic inches in a massive bony structure that is the skull. It can be reached with a rifle bullet only through the eye. Who can find so small a mark in a head that is continually moving about with darting movements like the striking motions of a rattlesnake?"

"How about the fourth-dimension process?" asked Charlie hopefully.

"Entirely inadequate. The creatures are too enormous in size."

"But," objected Tony, "you removed a subway train—two of them in fact—from the tube under the East River."

"Yes, we did. But the apparatus by means of which that was accomplished is some eight hundred miles away and is partly destroyed at that. We have nothing in Olaka of sufficient power."

The uproar outside seemed to increase in violence.

"They will make mince-meat of the natives," commented Ward.

"Not so," said Jerry, "for the Pithies and Grimaldi are very fleet of foot. Most of them have probably reached the cliffs by this time and are safely out of reach. We are not so fortunate ourselves, for they could easily overtake us if we tried to escape on foot."

"Your airplane?" suggested Tony.

"It's at the other end of the lake. I haven't yet recovered it. You'll remember it was used in your previous escape."

"Oh yes, so it was," said Tony. "Well, here we are, and may the Lord help us if they break through."

THERE was a thump as of a heavy object colliding with the doors of the main entrance. Then came a peculiar sniffing sound, almost as if some huge canine were nosing about outside.

"They're here," said Jerry, calmly. "Probably they've given up in the city and are after us."

He rushed to the cage of the lift, his three visitors following hastily.

"We must get to the balcony and attract their attention from the outside," said Jerry, "else they'll push the doors in and wreck the castle."

"The doors won't hold?" Charlie asked this without taking thought.

"Hold? Why, these creatures are nearly eighty feet long and weigh probably seventy thousand pounds each. Thirty-five tons of flesh and bone hurled against those doors, even with very little speed, will go through as if they were paper!" Jerry had stopped the lift at the ninth floor of the great building.

They emerged upon a railed-in balcony which looked out over the paved area fronting the lake.

One of the huge survivals of prehistoric times had planted his huge bulk directly at the castle entrance. The other two were lumbering about on the pavement, alternately nosing its surface and raising their small heads high in the air to inspect their strange surroundings.

"I'm a fairly good shot with a rifle," whispered Tony, "and I think I could pot one of those beady eyes from here. Want me to try?"

"Better not," said Jerry, "it would merely arouse the others to action. You couldn't possibly get all three. But, if we remain quiet, they may wander away and that would give us time to devise a means of combating them successfully."

So they remained in silence, keeping as far back as possible to avoid the possibility of being discovered by those beady, roving eyes.

A Strange Battle

THERE came suddenly from the region behind the castle a rising turmoil of whistling screeches, the awesome sound becoming ever louder and more confused as it rapidly drew nearer. The brontosaurians retreated slightly from the building and huddled together, raising their heads on the huge necks that supported them and staring intently upward.

"The pterodactyls!" breathed Jerry, delightedly.

"Returning to attack?" asked Ward. "What can they do against these monsters?"

"Ever see a pair of robins defending their nest against marauding boys?" countered Jerry, softly. "These winged creatures are no mean antagonists, though they are peaceful unless molested. They have probably gone for reinforcements and are returning in great numbers to repulse the monsters who routed them. The flying reptiles of Subterrania are similar to the pteranodon of the Kansas chalk. Their wing spread is from eighteen to twenty feet and the head, from snout to the summit of the crest rising from the occiput, is as much as four feet in length in the larger males. The mouth and jaws are fully as large as those of the brontosaurus, and as powerful. They have the additional advantage of aerial locomotion. This will be a great battle."

The din overhead was now terrific and the huge creatures on the courtyard pavement answered with their reverberating screams, backing slowly in the direction of the lake shore. The four men on the balcony breathed somewhat more easily.

Then, from out the flock of flying creatures that could be seen high overhead, there swooped a half dozen of the

enraged avengers. Straight for the three upraised heads they dived and the watchers thrilled to the excitement of the strangest battle ever witnessed by human eyes. The foremost brontosaurus engaged two of the winged antagonists and, at the first lightning dart of his snakelike head, a pterodactyl went fluttering to the pavement, the peculiar crested head severed completely from the grotesque body. But the second of his attackers had obtained a bulldog grip of the long neck, just back of the head, and was holding fast, flapping its broad wings with incredible vigor. Confused and blinded by the fierce onslaught, the brontosaurus arched its neck and clawed with the hooked talons of its forefeet at the persistent foe. Blood spouted from the sinuous neck where it was torn by the sharp teeth of the pterodactyl and additional wounds were inflicted by its own wildly swinging claws. Then, by a fortunate chance, it caught the body of its tormentor in one of those sweeping swings and tore it free from the head, the jaws of which still clung tenaciously for a moment after the mangled body was flung to the pavement.

Circling high above, the main body of the attackers kept up a continuous screeching that echoed and re-echoed from the cliffs in hideous dissonance. Encouraged by the partial success of the first of their kind, they spiraled lower and lower, fresh reinforcements swooping into the fray by twos and threes. Soon the courtyard was a howling maelstrom of bloodthirsty reptiles, the foul reek of their bodies filling the air to the point of nauseating the watchers.

A screeching pterodactyl, one wing torn loose and its body flung high by a desperately battling brontosaurus, fell heavily against the balcony, tearing away a portion of the railing in its descent. The four men retreated to the corridor, watching through the open door of the balcony in fascinated horror.

For a time the bellowings of the brontosaurians continued unabated and the lunges of their gory heads accounted for many of their winged assailants, as did the powerfully thrashing claws. But the contest was too unequal, and eventually the bellowings were silenced and the pterodactyls exulted in whistling crescendo, fluttering and screeching and fighting one another as they tore at the vitals of the huge bodies which now lay inert, already slashed to ribbons.

"Phew!" exclaimed Talbot, slamming the door on the sight. "Rotten carnage, isn't it? But, all the same, we owe our lives to the pterodactyls. Let us leave them to their feast."

There was not a dissenting voice from the visitors. And later, when they found themselves under the bright lights of the laboratory, they were a pale and shaken lot.

CHAPTER IV

Plans Are Discussed

FOLLOWING a sleeping period of eight hours, the four men were gathered in the breakfast room of the castle, where Jerry Talbot presided over the excellent meal that was prepared and served by two of the specially trained Grimaldi.

"Gentlemen," said Jerry, when the formalities of morning greetings were over, "I brought you here for a purpose, and it now devolves upon me to explain more fully the reasons for my action. It seems that you fellows have a little explaining to do—that mental message to me for one thing. I can not thank you sufficiently for coming to my assistance, but I am sure you will have no cause to regret it. There are, as I told you, a great number of the victims of our experiments still alive and in good health. The greater proportion of them, I believe, can be restored to their normal mentality and returned to their homes. But there are several problems to be solved before this can be accomplished, not the least of which is that of the huge reptiles of the formerly sealed cavern."

"There are many more of the beasts?" asked Ward.

"Probably hundreds. Ainsworth and I narrowly escaped death in the huge cavern they inhabit when we first explored the reaches of Subterrania. And, at that time, we saw a great underground plateau literally swarming with them. Not only was the brontosaurus represented, but the tyrannosaurus, the iguanodon, and many other huge species of which there is no record on the surface. It was apparent that these monsters seldom left this, their natural habitat, but we closed off the connecting passage regardless. Now it seems that our barriers were of insufficient strength. Or, possibly, a slight quake has reopened the old passage or formed a new one. This must be remedied, else we may have even more serious incursions with which to deal."

"You think there may be more of them loose in the main caverns?" inquired Tony.

"There may be, of course. But we will check that up by means of the exploring rays of my laboratory television. I take it that you used similar means in getting in touch with me."

"Yes," said Tony, "and partially copied from your apparatus, which I took pains to examine when last here. There are the same dual rays used in my apparatus, but I use them for two additional purposes. I carry sounds as well as vision, back to the observer, besides having developed means of impressing thought waves on the transmitted rays."

"I THOUGHT as much," said Talbot. "We must discuss that further. It's an extremely interesting development and quite in line with much of the work done by Ainsworth and myself. But, to return to the most important subject: the next move, after insuring ourselves against further interruption by the monsters of this underground world, is to evolve means of capturing the supermen and morons from their encampment. They must then be paired off correctly and subjected once more to the psycho-transference operation, so that the mentalities once stolen may be restored to their rightful owners. It is an enormous task that confronts us."

"I should say so," commented Ward, "and if this psycho-transference thing is anything like as complicated as your fourth dimensional deductions, I expect to be dizzy after listening to your theory of its functioning."

Charlie and Tony laughed.

"Did you get the fourth dimension thing?" asked Charlie.

"Why, yes, I think so," said Ward, huffily. "At least I have in my mind a great chaos of new thoughts regarding space-time, intervals, the finite universe, Lorentz Transformations, and the like, that will eventually crystallize themselves into a clear conception of the process used by Talbot."

Jerry defended him stoutly. "Mr. Platt absorbed the difficult theory perfectly," he said, "and made careful notes of the salient points. I'm sure he fully comprehends. But this isn't getting about our business. My suggestion is that we first scan the main caverns and passages of Subterrania for signs of others of the reptilian monsters, and after that devise means of closing off their domain once more."

"That's the stuff," agreed Tony, "let's get busy!"

He rose from the table. Breakfast was over and the four men repaired to the laboratory, where Talbot set the mechanism of his television in operation.

The Cavern of Monsters

THE dual ray generators sang merrily and the circular table-top screen lighted as their energy was car-

ried to the two projectors on the roof of the castle. Jerry manipulated the controls until the beams converged on the outer courtyard, the scene of the battle of the night before. Nothing remained of the three monsters save the huge skeletons, great piles of bones which would have delighted the heart of a museum curator. The pterodactyls, glutted, had left the scene.

"Made a good job of it, didn't they?" Ward commented with a shudder.

"Yes," said Jerry, "and I'm glad Ainsworth agreed to let the pterodactyls remain and reproduce when we first sealed the cave of the monsters. They have saved the day—thus far."

Again he manipulated the controls of the searching rays and a rapidly moving panorama of the sub-surface realm was revealed. It followed the shore line of Lake Atakna for a number of miles and they watched closely for signs of other huge reptiles. Here and there appeared a village of the natives, and in each case it was seen that the ape-men were engaged in their normal pursuits, giving no sign that danger was near, or even expected.

Then they came to a village that was in partial ruins, many of its huts having been trampled into the earth by monster feet. But the inhabitants had returned from their flight and were busily engaged in clearing away the debris and attempting to restore some semblance of order. Their attackers had gone.

"Probably the same creatures that visited Olaka," grunted Jerry, continuing his slow turning of the two handwheels that directed the rays.

A forest loomed into view, a strange jungle of mushroom-like growths that were so thickly spread as to overlap their six-foot tops. The upper surface presented the appearance of the back of a great, scaly monster slumbering peacefully at the shore of the lake. Pale violet these growths appeared in the light of the five suns of Subterrania, and here and there a clearing revealed the clusters of their translucent, blue-green stems. Then they came to a clearing but recently made, a clearing that was strewn with torn and broken stems and inverted bowls that were the tops of the mushroom growths. At the far end of the broad swath which had been torn through the jungle stood the most frightful monster they had ever seen.

Of the order of Dinosauria was this monstrous reptile, and similar in appearance to an iguanodon* in that it had extremely short forelegs, massive hind legs, and an enormous tail. But in size this fearsome creature was colossal. Standing as it did on its hind legs and tail, it must have reached a height of more than seventy feet and Jerry estimated its over-all length as a hundred feet.

"Well," he muttered, "that settles it. A number of the beasts are at large. We must get the airplane. But first to examine the reopened passage."

ONCE more he turned the handwheels and they left the forest where the huge dinosaur still munched at the succulent tops of the strange growths. They proceeded inland from the lake and were soon within view of the main cavern wall, which, at this point gleamed coldly luminous by reflected light from the five suns. A mound of concrete fragments and jagged boulders at the base of the wall gave evidence of the freshly-opened nature of the cave mouth, which was seen directly above.

"Not strong enough," muttered Talbot. "I knew it! But Ainsworth was stubborn about this as about everything else."

He twisted the handwheels and they passed through the wall of rock as if it had not existed. It seemed as if they had emerged into the open and were on the surface of the earth, for so large was this cavern and so warmly was it lighted that it gave the impression of boundless spaces open to the light of the sun.

"The cave of the monsters," explained Jerry pedantically "is more than two hundred miles in length and some sixty miles high at the zenith of its arch. It is oppressively warm and humid as compared with the even temperature and comparative dryness of what we call Subterrania. A great river of lava runs along its entire circumference on a ledge that is raised about six miles from the main floor of this bubble in the earth's crust. From this fiery liquid, which flows from the bowels of the earth in a slowly moving stream, is radiated the light and the heat. The evaporation of water from the underground lakes and rivers of this cavern provides the excessive humidity. Where the river of lava re-enters the interior of the earth there yawns a veritable inferno that is unapproachable, even by the huge reptiles."

The slow movement of the handwheels continued, and the view carried them into the heart of the huge cavern. The scene was of tropical character, though the twining, matted vegetation was like nothing they had ever seen on the surface of the earth. Great circular patches there were of impenetrable, interwoven vines of the thickness of a man's body, from which projected sharp thorns ten to fifteen feet in length. And, in the background, there towered cliffs of basalt that marked the rim of the great plateau which Jerry had previously mentioned. The exploring rays of the television carried them over the edge, where they saw the evidence of a great break in the cliff, which had tumbled thousands of tons of rock to the lower level, thus providing the precipitous trail by means of which the monsters of the plateau made their way from its heights.

SPEEDILY they traversed the broad area of the rocky plain, halting now and again at the shore of some vegetation-fringed lake to observe the antics of a group of the monsters, some of one variety, others of entirely different appearance from any they had yet seen. A thickly carpeted section that seemed to be of chalk-white reeds fully ten feet tall was literally alive with huge saurians of even more terrifying aspect than the one they had seen amongst the violet mushrooms. A vast crater loomed into view, partly filled with a lake of what they took for boiling water. At closer range the water proved to be filled with enormous amphibia of the general appearance of worm salamanders* (the *Batrachoceps attenuatus*), but of fifteen to twenty feet in length—veritable sea-serpents. Their large numbers and the activity of their movements accounted for the turbulence of the waters, and many of the strange creatures crawled about in the rim of the crater above the water line. Two small iguanodons peered over the crater's rim and seemed to be much excited over what they saw. In stepping too closely to the edge, one of these creatures lost its footing and went slithering down the steep side, where it was promptly pounced upon by dozens of the huge salamanders and became the center of a wriggling, squirming mass of voracious vertebrates.

"Ugh!" exclaimed Jerry.

And he pulled the switch of the television apparatus, leaving the screen blank.

"Well, I'll be dog-goned!" remarked Ward Platt. "It's all the prehistoric ages rolled into one. Paleozoic and Mesozoic we saw, and I'll wager that we'd get back to the Protozoic if we explored deeply enough. But this isn't getting us nearer to the solution of Jerry's problems."

*Of the lizard genus.

*Lizard-like amphibia, without scales.

Tony Volunteers

"WHAT'S the next move?" asked Tony.

"We must get the airplane and clear the main cavern of whatever of the monsters remain outside," announced Jerry.

"But the plane is some six hundred miles away," objected Tony, "if it's still at the point where we abandoned it. How will you get it?"

"It's nearly six hundred and fifty miles by air travel," admitted Jerry, "and the only way to get it in to send you or myself to that point via the fourth dimensional compression."

"Send me," volunteered Tony at once. "I can operate the plane, but I must admit I would be afraid to monkey with the controls of your fourth dimensional apparatus."

"Thanks." Jerry's tired eyes expressed far deeper gratitude than the simple word conveyed.

"It's okay," said Tony, "and let's make it as snappy as we can."

"But have you a plan for ridding the realm of these monsters?" inquired Ward of Jerry.

"We'll try and figure it out while Tony is away. He will need about two hours for the return journey in the plane and that should give us plenty of time."

Jerry was already adjusting the controls of the television. He directed the exploring rays carefully and there quickly appeared in the screen the image of the trim cabin plane which had carried the escaping New Yorkers to the tunnel entrance under Jackson, Mississippi, several months before.

"Still in perfect condition," breathed Jerry, "and ready for you, Tony. Are you ready?"

"Sure thing!"

Jerry turned his attention to an adjoining apparatus that was built about a vertical helix of heavy tubing, which was of sufficient size to accommodate the body of a man within its coils.

"The process is somewhat different when transferring a person from this point to another by the compression of that elusive fourth dimension. When I brought you three from the surface I projected a surrounding medium—the ball of orange light—but in this case the subject must enter the influence of the helix. You are the victim, Tony."

He moved a small lever and the helix was raised to a point six feet above the floor, thus permitting Tony to pass under its lower end. Another touch of the lever lowered the coil and Tony was imprisoned within.

"Like a monkey in a cage," he laughed.

Talbot was seized with a fit of violent coughing, but this did not deter him from the business in hand. He started a large rotary converter and the seven tall vacuum tubes of the apparatus slowly heated to their operating temperature. These tubes were a foot in diameter and more than five feet in height, and were connected to the rotary by means of extremely heavy cables. The current consumption must have been enormous, for the cylindrical plate structures within the glass walls soon glowed almost to white heat. Directly above Tony's head there was a small mirror, on the surface of which there impinged a pencil ray of dazzling light. Jerry adjusted the angle of the mirror carefully, watching the screen of the television as he moved the controlling dials. The beam of light, reflected to the surface of the screen, was so directed as to strike the pictured cavern floor at a point directly beside the airplane.

"All set," announced Jerry.

"Shoot!" replied Tony. And they could see that he had set his jaws in anticipation of the wrench he knew was to follow.

Jerry closed a contactor which operated a large oil switch on a near-by pedestal. The lights dimmed and there came a grinding clash, followed by a jarring thump and the characteristic sensation of the twisting and distorting of the space about them. Tony had vanished.

"Ye gods!" exclaimed Charlie, "did something go wrong?"

"Indeed not." Jerry pointed to the screen.

The light ray no longer painted its tiny brilliant circle on the cavern floor. But, in the precise location at which it had been directed, they saw Tony, looking somewhat dazedly about him. Then he turned in their general direction and smiled, waving his hand as a signal that all was well. They watched him as he clambered into the cabin of the plane, and, through the windows, they could see him fussing with the switch that controlled the atomic motor. The propeller turned over and was quickly lost in a blur as the plane taxied with ever-increasing speed over the smooth floor of the cavern. The tail came up, then the wheel, and Tony was off. The plane swung rapidly out of the field of vision and the three men left the laboratory to discuss the situation in Jerry's library.

CHAPTER V

The Search Started

WARD and Charlie were of little help to Jerry in solving the problem of disposing of the reptilian monsters. But the remarkable brain of the outlawed scientist worked overtime during Tony's short absence, so that, by the time the speedy plane landed on the paved area before the castle, there was heaped up a great conglomeration of paraphernalia in anticipation of the return, and three jubilant men were there to greet the voyager. Jerry had evolved a plan.

The plane taxied over the broad space, its brakes screaming in protest, and came to a stop between the pile of equipment and the huge skeletons of the defunct saurians. There were several suitcases, rifles, pistols, coils of wire, and one shiny length of tubing provided with a swivel mounting and several hand-wheels that gave it the appearance of a piece of ordnance.

"Expect to get all that junk in the plane?" asked Tony, when he climbed to the pavement.

"Positively," said Talbot, "and we're going dinosaur-hunting with it."

"Scheme all doped out?"

"Yes. I'll tell you about it when we are inside."

Jerry was already lugging some of the equipment to the open door of the cabin, and the three visitors followed his example. It was a tight squeeze, but eventually they had stowed themselves as well as all of the apparatus and the small arsenal in the five-passenger cabin of the plane.

"I'll ask you to pilot, Tony," said Jerry. "You can handle the plane as well as I, and I must be free to operate this equipment. If you don't mind, just head along the lake shore to the right here at about a hundred miles an hour."

"Sure thing!" Tony started the motor and jerked the plane from the pavement and into the air with the calm assurance of a veteran pilot.

As they followed the lake shore at an elevation of not more than two or three hundred feet, Jerry opened one of the cases and spread a portable direction-finder on his knees. At least this apparatus presented the appearance of a regular radio compass, for there was the regulation loop with its graduated dial as well as a high-powered short-wave receiver. But in addition to the ordinary instruments there was a complicated mechanism that was quite unfamiliar to the visitors.

"This," explained Jerry, "is the super-ether, developed

by Ainsworth and me. The old oscillograph, you know, has been used to measure and chart the electrical currents of the human body, including not only those produced in the functioning of the heart and lungs, but the actual nerve impulses as well. These have been found to be actual messages transmitted electrically to and from the brain, and are definitely measurable. By combining the coils with the multi-stage amplifier of my direction-finder, I expect to be able to pick up the characteristic disturbances occasioned by the body currents of the huge saurians and thus locate any of the beasts that might still be at large, if I come within a half mile of them."

WHILE speaking he had completed the adjustments to his satisfaction, and the tiny light ray of the coils now impinged on the narrow tape that was drawn across its focus by a faintly whirring clockwork mechanism. He moved the loop antenna slowly from side to side as he tuned the receiver to the lower wavelengths.

"Will this instrument not be likely to pick up waves that are set up by our own body currents and those of the ape-men?" asked Ward Platt.

"Hardly," answered Jerry. "Not only are they extremely weak, but entirely too high in frequency to be within the range of this instrument. In the case of the monsters, however, the waves created are far more powerful and are something over one meter in length. Consequently my receiver will be able to pick them up."

The tiny point of light painted an uninterrupted straight line of black on the sensitized paper of the tape, and the visitors continued to watch in silence as the plane sped steadily over the courses prescribed by Jerry. Then the thin black line commenced showing a measurable degree of waviness and this quickly resolved into a regular series of jerky wave forms that told of rhythmic pulsations in the circumambient ether.

"Ah," breathed Jerry, swinging the loop to obtain maximum and minimum indications, "we have a line on one of them now."

At his direction, Tony headed the plane inland and climbed to a slightly greater altitude. They were above the forest of overgrown mushrooms.

The Death Flame

THE indications grew stronger as they progressed inland, and the occasional adjustments of the loop provided accurate means of setting the plane's course. They soon came upon the broad swath through the forest which marked the trail of the huge creature they were hunting. This was followed until they reached the edge of the forest and saw that there was a native village directly ahead.

The scene of destruction that greeted their eyes was one that beggared description. The huts were utterly demolished throughout the greater portion of the village, and here and there were huge furrows where the marauding monster had torn up pavements and dug deeply into the earth with its powerful claws. The ruins were blood-spattered, and mangled bodies of the ape-people and their young were strewn everywhere within vision.

Jerry growled his anger. "Do you see why we must rid Subterrania of these creatures?" he snarled. "This one surprised them."

Then they saw the monstrous form of the scaly reptile. Alone it towered amidst the ruins, weaving its tiny head from side to side as if searching for more of the ape-people to satisfy its blood-lust. It was the same creature they had viewed in the television and was of even greater size than they had thought. Propped upright on its thick tail and heavy hind legs, it surveyed its surroundings in lordly dominance, blood dripping from its forelegs and shoulders.

Jerry busied himself with a strange weapon as Tony stalled the plane, slipping into the slow, hovering glide that was its most unusual feature. They lost altitude very gradually as they circled immediately over the monster, which now observed them with beady and suspicious eyes.

"What in Sam Hill is that?" asked Charlie, as Talbot connected two flexible cables from the rifle-like weapon to a high speed, atomic-motor-driven generator that was revealed by the opening of another of the cases.

"A ray-projector, variable frequency, for producing disintegration of atoms," grunted Jerry as he tightened the last connection.

"Going to disintegrate him?" asked Ward.

"No. It isn't possible. This ray is only effective in the disintegration of certain of the simpler elements. But we can start a progressive disintegration of the nitrogen atoms in the air, which produces oxygen and causes a release of energy in the form of heat. The heat burns the oxygen and I use the resulting flame against this vile creature."

HE had leveled the weapon through an open window of the cabin and started the powerful generator that supplied it with energy. Tony manipulated the controls of the plane to bring them within very close range, and the remarkable ship was now almost stationary as if in a gravityless field. A screaming bellow came from the huge beast below them and this was answered by a shouted curse from Jerry as he pressed the catch that released the energy of his projector.

A sudden spurt of dazzling white flame followed this motion—a pencil of sputtering incandescence that nearly blinded the observers. Full on the bloated flank of the reptilian monster it struck, and, with a scream of pain, the vast creature bounded high in the air, twisting and squirming in its agony and fright. Then, swift as a race horse, it plunged through the demolished village and made for the forest in great flying leaps.

Quick as a flash, Tony had started the motor of the plane and turned in pursuit. Jerry sent forth another spurt of the death flame as soon as they were within range. One of the creature's forelegs was burned away from its body as by a huge oxy-acetylene flame. It screamed anew and turned to face this terrible enemy from the air. Ruthlessly Jerry poured the awful flame into the enormous body and the rank smoke of burning flesh filled the air. But the creature was possessed of marvelous vitality and, with its vitals literally aflame from the tremendous heat, bounded again and again high in the air in its desperate attempts to reach out and destroy its persistent enemy. Then, by a lucky chance, the flame contacted with the slender portion of its long neck, just back of the small head, which was thus severed completely from the body. Jerry shut off the power and they watched the death struggles of the headless monster, which flopped and crashed about in the forest for many minutes.

"Waugh!" said Tony. "Let's go away from here!" And he shot the plane to greater altitude and once more headed for the lake.

The Passage Is Closed

THOUGH they cruised around in the main cavern for several hours there were no further indications of the presence of others of the monster reptiles. Only when they approached the passage which led to the cavern of the monsters was there any irregularity in the tiny black lines of the oscillograph tape, and the positions of the loop showed conclusively that the other disturbances were created behind the quarter-mile thickness of solid rock wall that separated the two caverns.

"Well," said Jerry finally, "it seems there were only the

four that ventured forth. Now to close off the passageway."

He directed Tony to land the plane at a point about five hundred yards in front of the broken concrete barrier that had for so long a time held back the huge reptiles from the main caverns of Subterrania. They clambered to the smooth rock floor and Jerry was quickly at work connecting up other portions of his equipment.

The shiny tube with its swivel mounting and hand-wheels was set up on a rugged metal tripod, and flexible cables were carried from it to the same generator which had supplied the energy that destroyed the colossal saurian.

"Atomic disintegration again?" inquired Tony.

"No, molecular disintegration in this case, and so a somewhat more complicated ray is used. You understand, of course, that we have thus far learned how to start the disintegration of relatively few of the elements, and different frequencies are required for each. In this case we are to cause the progressive disintegration of calcium carbonate, while in destroying the gigantic lizard we disintegrated nitrogen only. This rocky wall is of crystalline limestone, comprised essentially of calcium carbonate—one part calcium, one part carbon and three of oxygen. We are to break it down into its elements, calcium, carbon and oxygen. For this reason we must wear masks, since a considerable amount of carbon dioxide will be liberated."

He had located a number of bulky gas masks in one of the cases and now handed one to each of his visitors and prepared to don the fourth one himself.

"But," objected Ward, "you use such a small generator. I have always been under the impression that a tremendous amount of energy would be required to disintegrate a compound."

"There is. But, you see, I merely start the process by exploding a few atoms. In other words I use simple atomic disintegration to start molecular disintegration. The energy released by these few is communicated to their fellows and the process then requires no additional external energy beyond that required to limit the action and control its direction and magnitude. As you know, an atom does not radiate energy except when one or more of its electrons changes its orbit. Now, when my energy is directed into a material in order to disintegrate a few of its atoms, it merely speeds up the electrons in their orbits to such a degree that they fly off entirely—the atom explodes, thus releasing its entire energy suddenly. This gives the energy to break down even a complex inorganic compound into its elements."

HE started the generator and directed the muzzle of the tube at the rock wall before them. There was no visible beam when he pressed the release, but a shower of sparks flew from the point of contact, and their surroundings were lighted with such brilliance as to completely dim the normal illumination of the five suns of the realm. Their ear-drums were paralyzed by the terrifying roar that followed the rending of the elements.

The ray cut into the solid rock like a knife into cheese and they quickly saw the method to be used in blocking the passage-way. Jerry started cutting on a vertical line tangent to the curved right edge of the yawning opening through which the monsters had entered the main cavern. He extended this vertical cut to a point about one hundred and twenty feet above the cavern floor—more than twice the height of the opening—and then started cutting horizontally. In a few minutes he had outlined a complete arch over the passage, an arch that encompassed considerably more than enough of the hard limestone to fill the passage when it fell away by its own weight. But it would be necessary to cut very deeply into the wall for a sufficient weight of the material to be freed to break away from the main wall, due to its cantilever-supported weight.

A veritable inferno raged within the crevices being cut by the action of the ray, and the solid rock beneath their feet trembled in harmony with the tremendous pulsations of released energy. As the minutes passed, the cuts drove more deeply until they could see that the great mass of stone was sagging. The horizontal crevice was opening slightly as the forward face of the cut-away section sank slowly under its own weight. Nearly sixty feet wide and of about the same height, the loosening section had now been cut in to a depth of more than two hundred feet. The shearing stresses at the support of that cantilever must have been enormous.

Then, as if in wonder as to the cause of the commotion, a huge head was thrust forth from the mouth of the passage. Huge it appeared when only the head could be seen, but tiny it was in comparison with the enormous body they could now see forcing its way forward in the opening through which it could barely squeeze. The watchers were frozen with horror, for, with a single one of its tremendous leaps, this gigantic brontosaurus could land in their midst and they would be powerless to escape. But Jerry only increased the power and moved the direction controls of his tube a little faster.

Blinking uncertainly in the dazzling light, the brontosaurus looked upward, curving its tapered neck outward from the semi-darkness of the passageway. Then, suddenly, there came a terrific roar. The earth shook as thousands of tons of rock crashed into the passage, sealing it forever.

The head, with its staring eyes, rolled a hundred feet from the caved-in outer surface of the wall and lay inert where it fell.

Jerry cut off the power and started disconnecting the cables, warning his visitors by pantomime not to remove their gas masks.

That job was finished—and well.

CHAPTER VI

Across Atakna

"NOW," said Jerry, when they were once more in the cabin of the plane, "suppose we shoot across the lake and do a little reconnoitering. We have been delayed long enough in the matter of the restoration of the stolen mentalities."

He took the controls himself and they were soon headed over the still, dark waters of Atakna.

"Talbot," ventured Ward Platt, when he had removed his now unnecessary gas mask, "may I inquire as to the reason you did not use the flame projector on the attacking brontosaurus at the castle?"

"Only because I didn't think of it at the time," admitted Jerry, "but you must not think of that ray weapon as a flame projector. It merely directs a beam of complex vibrations within the limits of which beam the disintegration process is carried out. In this case there is the progressive disruption of atoms of nitrogen to form oxygen. Also, a partial vacuum is thus set up within the ray's influence and oxygen rushes in from the surrounding air to fill the gap. This great concentration of oxygen is then caused to burn at terrific temperature by the intense heat generated in the disintegration of the nitrogen atoms. It worked fine, didn't it?"

"I'll say it did!" Ward Platt subsided and lost himself in thought as he gazed through the window at the dark waters that were rushing so swiftly by underneath them.

"The larger projector is similar to that used in boring your great tunnels?" asked Tony.

"The same. It is adjustable to various frequencies and is capable of starting the disintegration of no less than eight of the elements. We were thus able to bore through all of the various strata encountered, since we may always remove the major constituents and leave a minimum of residue. It is simply a question of eliminating elements in such proportion that the greater part of the left-over material is liberated as a gas of some sort and little or no solid matter is left remaining."

They were approaching the far shore of the lake and Jerry reduced speed as they neared their destination.

"Here," he announced, "is the encampment of the supermen and morons."

THE plane drifted lazily across the strip of land which separated the village of the exiles from the waters of the lake. At this point the footing seemed to be of powdery sand that was filled with bright particles, probably of mica, that caused the whole to gleam with silver-brightness in the light of the five suns. The village itself was orderly and presented to view hundreds of rudely and hastily constructed huts, whose roofs were composed of overlapping discs of iridescent hue that reminded the visitors of the scaly hides of the monsters they had recently fought.

"Enormous lily pads," explained Jerry in answer to a question from the hitherto silent Charlie. "The shallow shore waters of the lake abound with such vegetation. The pads are sometimes ten or even twelve feet in diameter, and over an inch thick. When thoroughly dried out they are as tough as shoe leather."

There was little evidence of activity in the village at first, though they did make out a few wandering couples near the outskirts. Each pair was of the opposite types of beings—one a superman, the other a moron who seemed to be entirely dependent on his larger and stronger companion. Our visitors drifted to a lower altitude to obtain a closer view. Jerry seemed to be very much excited and his nervous cough reasserted itself with alarming frequency.

"You see," he explained between spasms of coughing, "the morons and our supermen were at first deadly enemies and fought desperately until they discovered their mental mates here and there, when the fighting ceased and they retired to this secluded spot to think things over and to make plans. Each pair that you see below represents a moron and the corresponding superman or woman to whom that moron's brain was transmitted. The supermen have acquired these intelligences but are entirely unhappy in the possession of them, and now guard jealously the interests of the individual from which the particular mentality with its memories of the past was transferred. During the original fighting a great number on both sides were killed, for which reason there are still quite a few who have lost their mental mates and are thus hopeless of ever being restored to normality. Of course, they all bear an intense hatred toward Ainsworth and myself, but the unmated ones are now supported and protected by those who have found their mates. It is a wholly pitiful situation."

Although the atomic motor of their plane was practically noiseless, the swish of the slowly revolving propeller was distinctly audible, and it was undoubtedly this sound that caused one of the supermen to look upward. He gesticulated excitedly and immediately set up such a clamor of shouting that the occupants of the huts came tumbling out in great numbers, some of them armed with the army rifles they had originally obtained in the castle.

A Warm Reception

JERRY unfurled a white flag he had brought with him and waved it from one of the open windows. Surely this universal emblem of peaceful intentions would be recognized by the supermen.

But no, there still smouldered an intense resentment against the perpetrators of the misdeed, the cause of their misfortunes. They would kill the only living being who had it in his power to restore them to normality!

A dozen rifles were raised simultaneously and metal-cased bullets whistled past the plane, a few taking effect in the steel walls of the cabin. Another broadside followed and this time the aim was better, for flying glass filled the cabin and the occupants ducked instinctively. Blood flowed from a great gash across Jerry's cheek.

"Why, dog-gone it!" shouted Ward in anger, "they will, will they?" And he grabbed a Springfield from the heap on the cabin floor.

"No—no! I tell you, Platt!" Jerry screamed in protest as he pulled back on the stick and shot full power into the tiny motor. "You'll spoil everything. Don't—don't shoot them!" he babbled.

But there was little need for the admonition, for the airplane had already zoomed far out of range of the villagers. Besides, hot-headed Ward Platt had dropped the rifle in embarrassment.

"Sorry, Jerry," he muttered, "I didn't think. But what's the matter with them? Don't they realize that they can't be helped except by you?"

"They don't trust me. And small wonder. They—"

But Jerry's speech was cut short by a paroxysm of that awful coughing and his guests exchanged significant glances of pity.

The far shore of the lake dropped rapidly astern as the plane headed swiftly in the direction of the castle.

It was a puzzling and altogether incomprehensible situation they faced, and Tony turned it over in his mind as they sped toward Olaka. Jerry was thoroughly cured of his crazy ambitions, he mused. Ainsworth! He had been the controlling factor in evolving the terrible plan of the two! And, once freed of the malign influence by the death of his partner, Talbot had repented. But he was a sick man—very sick. Lucky if he lived to see to a finish the rectification of the damage he had wrought.

To think that such a realm had been discovered by these two in their accidental explorations below the surface of the earth! No wonder the world had refused to believe. *Pithecanthropus erectus*,* indeed! Who could expect the world to believe that Talbot and his partner had found huge bubbles in the earth's crust peopled by millions of the creatures such as existed on the surface not less than a half million years ago? Why should they be expected to believe that the two scientists had, by artificially speeding up of normal evolutionary processes, developed these creatures, first into semblances of the Grimaldi who roamed the earth about 25,000 years B. C., then into veritable supermen of great stature and marvelous physique, with superhuman brain capacity that was, however, empty of intelligence? Only ordinary apes had been seen in the cavern underneath the subway tunnel, was the general opinion of the populace. Who would believe that hundreds of the unfortunates who were kidnapped from Greater New York had been subjected to this "fantastic" brain surgery that had robbed them of their minds and had transferred these stolen intellects to the receptive brain structures of the supermen? It was utterly ridiculous, but here was the proof. And the prehistoric monsters! Perish the thought that they should ever tell to the press the story of their existence! Tony shook his head.

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*An erect apeman, remains of which were discovered by Dubois in Java in 1893. It is supposed to be one of the "missing links" between man and ape.

Charlie laughed. "Day-dreaming, Tony?" he asked.

But they were dropping to a landing on the paved area before the castle and Tony did not reply.

A Knotty Problem

"GENTLEMEN," said Jerry, when they had once more gathered in the laboratory, "you can now see for yourselves how difficult is the task in which I have asked you to assist. In time, of course, I am sure the borrowed mentalities of the supermen would come to the only too obvious conclusion that the sole remedy for their condition is to be obtained through one Jerry Talbot. But I fear I shall not be here that long. The work must be started at once if it is to be successful, and our problem is to get these poor creatures into the castle for treatment. But they must not be harmed—any of them."

"Might we not gas them?" suggested Ward.

"I am afraid not. There are no gases we could safely use. The irritants, such as chlorine and phosgene, would prove fatal if a great enough concentration were used to permit of removing all of them from the village before recovery. The lachrymators, such as *xylyl bromide* and *ethyl iodoacetate*, would not do. And a paralyzant—prussic or hydrocyanic acid—means almost instant death. No, we must use other means."

"How about the paralyzing energy used on the original subway victims?" asked Charlie, thinking ruefully of his own unpleasant experience.

"The generator of that energy was unfortunately destroyed at the time of the explosion under the tunnel." Jerry seemed disconsolate and his once handsome features appeared drawn and unusually haggard under the bright lights of the laboratory.

"Why not bring them here willy-nilly by the fourth dimensional process, as we were brought from New York?" asked Tony.

"We could not bring more than four at a time. And if one of those balls of orange flame whisked away four of their number before their very eyes, I fear the rest would flee the district and break up into smaller groups of fugitives who would be overcome by hunger and disease. We should never gather them together again."

"Then what's to be done?" Tony's expression deadened to one of discouragement.

Jerry hesitated, looking apprehensively from one to another of his visitors. "It is I whom they hate and fear," he said finally, "but it might be that one of you three would find a welcome among them, and would be able to talk them into voluntary submission to the operations that would restore them. It is a chance, of course, but—"

"I'll do it!" Tony interrupted him enthusiastically.

"Not on your life!" exclaimed Charlie, "I will."

"How do you get that way—you fellows?" objected Ward. "How about me?"

And Jerry actually laughed. It was good to have friends like these—friends who were willing to forget his past mistakes and to aid him in his attempts at partial atonement.

Tony Wins

THE good-natured argument as to who should visit the village across the lake was ended when Talbot proposed that the three men draw straws for the honor, as they persisted in calling it.

"You always were a lucky devil," commented Charlie, when the longest of the three wires, which Talbot concealed in his fist in lieu of actual straws, was drawn by Tony.

Ward Platt grunted his disappointment, for he was particularly anxious to get into the thing himself.

But Jerry stared apprehensively at the screen of the television when it was adjusted to obtain a view of the village across the lake. Excitement still reigned among the villages.

"You must be very careful," he warned Tony, when the latter was enclosed in the helix of the fourth dimension compressor, "they are quite upset over in the village, and nothing must happen to you. We will watch carefully in the television and I'll do my best to return you to the laboratory immediately in case of trouble. But be careful, won't you?"

"Sure. Don't worry about me," Tony said confidently. "This is duck soup for me."

He braced himself for the shock of the transmission.

The tiny light spot of the mechanism was adjusted to a point on the outskirts of the village. It was located in the shadow of a huge mushroom growth and would afford temporary shelter to Tony while he looked over the ground before actually entering the village.

"Ready?" asked Jerry.

"All set."

And once more, as the three men bent over the table-top screen, there came the fearful wrenching thump that seemed to warp the very universe around them. They saw Tony sprawl ignominiously beneath the great mushroom. He had braced himself a bit too rigidly in anticipation of the shock and lost his balance on arrival.

CHAPTER VII

Kitty Magehan

TONY scrambled to his feet and took quick stock of his surroundings. He was alone, but from the direction of the village there came to his ears a confused babel of shoutings and angry mutterings. He did not think it would be healthy to walk in on the inhabitants at that moment.

He settled himself at the base of the smooth stem of the great mushroom that spread its umbrella top twenty feet above the ground. He would wait until the villagers quieted themselves before risking a visit.

How long he sat thus he had no means of knowing, for his watch had stopped. But it seemed that several hours had passed and there was still but little abatement of the uproar in the village. He grew sleepy and found himself nodding. This would never do!

He jumped to his feet with the intention of walking about in order to keep awake. His first step brought him face to face with a startling sight. A wildly unkempt creature was staring at him from around the thick stem of the gigantic mushroom.

Hopeless imbecility gazed from those terrible eyes that were set in the unbelievably dirty face of a young girl. Her clothing hung in rags on her sparse figure and the lack of shoes and stockings betrayed the pitifully torn and bruised legs. Her hair, once beautifully russet in color, now showed a sickly green in the eerie light of the underground realm and it was matted with burrs and clay.

"Kitty Magehan!" gasped Tony, stepping back a pace in horror.

Kitty had worked in his office not six months previously—a likeable and talented stenographer. Gone was her brilliant wit, her fastidious neatness, her smiling cheerfulness. Utterly lost were her memory and her reason. But something in the hidden reaches of her brain stirred at sight of this sympathetic-looking man. She fell to her knees and fawned upon Tony like a puppy on its master. He choked back the lump which had suddenly risen in his throat. Where was her mate! What if she could not be found? Then Kitty's case would be quite hopeless.

"You poor kid!" exclaimed Tony, raising the pitiful remnant of this once attractive little girl to her feet.

He looked deeply into the large blue eyes, once so roguish and provocative but now glazed with the terrible stare of utter idiocy.

"My God!" he groaned, "this is terrible. No wonder Talbot is anxious to repair the damage! And this poor little girl is beyond help."

The whimpering girl pawed at his clothes and begged with those awful eyes until Tony's heart turned cold within him. She muttered incoherently, and great tears ran down her sunken cheeks.

Then there was the sound of loud voices from behind, and Tony wheeled about to face two of the supermen—huge, naked specimens of the mad scientists' handiwork. They glared malevolently at the intruder and one of them raised an automatic pistol. From the glitter in the eyes of the armed superman, Tony knew that he meant business, and, quick as a flash, he ducked.

But Kitty was even quicker. She sprang between him and the upraised pistol just as the man fired. Tony caught her as she fell, and, unmindful of the presence of his assailant, laid her tenderly on the mossy stone. He drew back the tattered remains of her dress and saw that the little puncture from which blood flowed so fiercely was directly over the heart. Kitty breathed her last in his arms.

"Oh you beast—you monstrous beast!" he screeched, turning once more to face the giant who had killed her.

But the giant was sobbing like a baby and he fell to his knees beside the slain girl, moaning his remorse as he attempted to get an answer from the lips that had closed forever.

Tony stared at the companion of the slayer and was amazed by the answering look of understanding and sympathy.

Palo and Brun

THE two giants carried the wasted, bleeding body into the depths of the mushroom forest and located a hollow where they prepared to bury it. Tony followed them unhindered and watched as they tenderly covered the remains and set up a small marker in memory of the unhappy girl. When they had completed their task they regarded him once more, now without anger.

"Who are you?" asked the one who had killed the girl.

"Anthony Russell—an engineer from New York," replied Tony, unhesitatingly.

"A friend of Ainsworth and Talbot?"

"Ainsworth is dead, and Talbot is dying slowly of a serious lung affection," said Tony. "While not exactly a friend of Talbot's, I am here at his request to assist him in repairing some of the damage that was done in the operations which were performed in the castle several months ago."

The two supermen stared aghast. "Ainsworth dead?" exclaimed the killer. "And Talbot wishing to help us? It is impossible!"

"Yet it is true," interposed Tony firmly.

They regarded him long and fixedly and the incredulity in their eyes slowly gave way to astonished belief. The killer brushed from his eyes the tears that once more smarted there.

"I am Palo," he said simply, "and my companion is Brun. We are known in the village as orphans, the name which has been applied to those who have no mental mates. The former possessors of the intellects with which we are now cursed have been killed or have passed away. We have no hope of release save in death, but many in the village still nurse a forlorn hope of regeneration."

"And Kitty?" Tony indicated the freshly covered grave.

"Likewise an orphan," replied Palo. "I am sorry she has gone, and at my hands. But it is better so. She is better off by far."

"A mercy it would be, if both of us could follow her, too," spoke Brun for the first time.

Tony regarded them in amazement—their speech was so gentle. "How many," he inquired, "are there in the village who have mental mates?"

"Two hundred and six," replied Brun. "That is, there are that number of beings from the outer world who have been bereft of their sense, and an equal number of our kind who have unwillingly acquired those minds."

"Besides sixty-three of us who are known as orphans," added Palo, "sixty-two now, since Kitty has gone." He glanced sadly in the direction of her grave.

Tony brightened with hope; these two men seemed amenable to reason. "I am here," he stated, "to bring a proposition from the castle to the villages. As I told you, Talbot is sorry for what he has done. He has sent for me and two of my friends to help him in the work of restoring these stolen minds to their rightful owners. We have agreed to assist him in every possible way and we will see to it that the work is promptly and properly done—provided the consent of the unfortunates of this village is given. Are you in sympathy with the proposal?"

Palo nodded in silence, but Brun made hesitating reply. "If what you say is true," he said, "we are in sympathy. But it may be you will have some difficulty in convincing the others. Those with mates still harbor a fierce resentment, though we of the orphans have become rather indifferent in the matter. Think—just think what this terrible thing means!"

He rose to his full height and beat his naked breast. "This body," he said, "was created by those two crazy scientists in the attempt to produce supermen from a lowlier race of creatures. As a body—a physical creation—it was a success, beyond their wildest dreams. Then they endowed Brun with a marvelous brain—a brain of perfect structure and exceptional capacity, but with nothing in it. To supply the deficiency they tore from the arms of his loved ones a business man of the upper world, an unfortunate who was hastening homeward to his sick wife and children. The already tortured brain of this unfortunate being was ruthlessly plundered—its hopes and fears and memories entering the brain of Brun along with the knowledge of speech, of art, of literature and of business as it is carried on in the upper world. That unfortunate has passed away but his fears and sorrows remain with Brun. The hopes have long since departed. Brun is a miserable creature."

He sat down once more, dropping his head into the huge, muscular hands that spent their sudden accession of nervous energy in clutching at the thick, curly hair.

"But the others," said Tony gently, after a pause, "is it your wish that they be helped?"

"Yes! Yes!" Brun and Palo spoke emphatically.

"Then you must help me to help them," said Tony. "Return to the village and tell them of my arrival. Spread the news that help is at hand. Beg them to return to the castle and place themselves in our hands—peacefully and willingly. The stolen minds will be taken from their present possessors and returned to their rightful owners, who will then be taken to their homes. Will you help?"

They considered for a moment; then nodded agreement.

"We'll try," said Palo simply, rising to his feet. "Please be so good as to stay right where you are until we return."

And he and Brun walked rapidly in the direction of the village.

Reconciliation

THE Subterranian forest seemed strangely silent and full of disquieting possibilities. Tony dared not move

from his position, for he was certain he would become lost were he to attempt leaving the small hollow where Kitty's body had been interred. Besides, there was the admonition of Palo. He must be here when they returned.

But, as time passed and the sense of desolate isolation deepened, Tony was assailed by grave misgivings. Suppose, even now, they were creeping stealthily through the forest with the intention of taking his life? Occasional mysterious sounds from the depths of the vast mushroom thicket gave color to this suspicion. But Tony was no coward and he resolutely stood his ground.

He knew that it could not be much more than a mile to the village, but he had not the faintest idea of its direction. The five widely separated suns gave him no indication of position, for he had not studied their grouping with relation to the layout of the main cavern. There was no east nor west, sunset, or night in the realm of Subterrania. He wished devoutly that Charlie or Ward had accompanied him on this mission.

Then there came a rising murmur of confused sounds—shouts and pistol shots. There was now no doubt as to the direction of the village, nor regarding the excitement aroused by the message of Palo and Brun. But were the demonstrations a sign of approval or disapproval of his proposal? The continued reverberations of the shooting led him to believe that the latter was the case. And the sounds drew nearer with every passing moment.

There was nothing he could do. If the supermen were bent upon taking his life he could not escape them. He would get no more than a few hundred yards into the forest before they would be upon him. So he waited patiently and stoically, trusting that Jerry would be able to pick him up in one of the orange flares if danger became imminent.

Fully twenty of the supermen burst into the clearing, howling and leaping and shooting rifles and pistols into the air as they advanced. They were everywhere around him before he could stir, and he was immediately the center of a wildly capering mob of the giant creatures, the foremost of which were Palo and Brun. Great hands seized him and, helpless to resist, he was borne on the shoulders of first one and then the other as they hustled him unceremoniously from the forest.

With his breath nearly jolted out of his body, Tony was finally lowered to the ground in a large open space of the village, where he found himself surrounded by the entire population, who had now calmed down to perfect order and regarded him expectantly from a respectful distance. Palo and Brun flanked him, Palo addressing the encircling crowd.

"Friends," he shouted, "this is Anthony Russell, of whom I told you. He will arrange with Talbot that those of you who have mental mates will undergo operations to restore to those mates the stolen mentalities that now torment you. Do you agree to place yourselves in the hands of Mr. Russell?"

Volunteers!

THE reply was instant and deafening. The magnificent bodies of the super-people responded with sudden renewals of their previous demonstrations. They used the remainder of their ammunition in a salvo of shots fired into the air in celebration. Pathetically staring morons were hugged to their huge breasts, and even the orphans joined in the jubilation. Tony heaved a sigh of relief.

Suddenly there came a puff of orange vapor at his side, and Jeremiah Talbot faced the assemblage! A fearsome quiet ensued.

Then there rose from the morons a piteous babbling and whimpering. They groveled in the dust and moss, their groping intellects sensing somehow that this man was to be feared. Jerry clutched at his throat and coughed horribly. Tony looked at him sharply and saw that flecks of blood stained his lips. His time was indeed short!

The supermen were silent and each gave undivided attention to his or her mental mate. They picked the unfortunate creatures from the ground and comforted them with unintelligible mutterings and croonings as a mother quiets a babe. Palo and Brun stood by with folded arms, their features inscrutable.

Then Jerry spoke, and all listened.

"The message brought to you by Mr. Russell is gospel truth," he averred, "and it is my wish to restore each of you to his former condition. There is no ulterior motive this time. Mine is a mission of mercy. I would, as far as is possible, atone for my sins against you. My plea is for forgiveness, or, if this be impossible, for tolerance at least until the wrongs are set right. I wish to perform on all of you who have mates, the psycho-transference operation, reversing the former process. This, as you know, is a painless and bloodless operation and the results are certain and rapid. And, if you so desire, I shall perform it first on a single couple who will volunteer, the rest of the work to follow your observation of the results of the first operation. What do you say?"

Talbot waited apprehensively. Would they go back on their resolution of a few minutes previously?

The whimperings of the morons had been quieted, and the superman faced the speaker in an attitude of dignified uncertainty. It was difficult for them to change at short notice the feelings they had nursed for so many months. But Palo and Brun had presented the case well. A superman, a superb specimen of the scientists' handiwork, advanced from the circle of villagers, half carrying a tattered and disheveled moron of little more than half his size.

"We volunteer for the initial experiment," he stated simply.

And the cheer that rose from the encircling crowd gave ample evidence of the success of the mission. Jerry's eyes became very bright and his entire being radiated happiness. But for many minutes he was unable to utter a word of gratitude.

CHAPTER VIII

The First Operation

THE volunteers, the superman and his mental mate, were returned to the laboratory by means of the fourth dimensional compression, the apparatus being controlled by Ward Platt, whom Jerry had instructed during Tony's absence. Ward was extremely proud of his accomplishment in mastering the delicate adjustments involved, and it was his task for the next fifty hours or so to return the villagers to the castle in groups of four from the spot designated by Jerry before he left.

Into the main operating-room of Talbot's unique hospital stalked the first superman with his cowering mate. The ten pairs of tables shone spotlessly white, and the musical whirr of the equipment in the adjoining power plant told of the functioning of the generators used in the psycho-transference operation. All was in readiness, and Jerry's face was radiant. It was unnaturally flushed; but his attitude was as cool and confident as in the old days before his illness.

The superman, Canas by name, was led to one of a pair of operating tables and stretched his magnificent frame on its white surface without a word of protest. Tony had been drafted as Jerry's assistant in the work and he proceeded to adjust the inhalator for anaesthetizing Canas with nitrous oxide and oxygen in preparation for the later

administration of ether. The vacant-eyed and trembling mental mate of Canas was handled by Jerry like a child, and, after considerable coaxing and pleading, was stretched on the companion table and breathing his first whiff of the gas.

The metallic skullcaps were adjusted over the heads of the two as soon as anaesthesia was complete, and Jerry turned the power into the mechanism on the wall to which was connected the cable from each of the caps. The many instruments and relays on the panel clicked and buzzed with instant activity and the air in the operating room seemed to take on a tenseness as it became charged with ozone. Both patients lay white and still, although breathing heavily under the ether. Jerry made constant use of the stethoscope and instructed Tony carefully in the further administration of the anaesthetic.

"As I understand it," said Tony, when the operation was well under way, "the functioning of the brain cells is actually electrical, and the transference of the knowledge and reasoning power from one brain to the other is merely a shifting of these electrical impulses from one to the other."

"Well, something like that," admitted Jerry. "You see, Tony, when we get right down to it we find that nothing really exists in the world or, for that matter, in the entire universe except energy. There is no such thing as finite matter. What we perceive as such is merely a manifestation of energy in some form or other. Substances as we perceive them are made up of molecules, the molecules of atoms, and the atoms of protons and electrons, which are nothing more than charges of electricity. This is true even in the convolutions, the cells of a living brain, and it is the arrangement of the electrical charges that determines the intelligence and knowledge of the possessor of the brain. We are now removing from each and every cell in the brain of Canas the charges that normally belonged in the corresponding cell in the brain of the moron. They are being absorbed in much the same manner as a storage battery absorbs its electrical charge; an actual electro-chemical transformation is taking place."

"IT'S a wonderful thing, Jerry, and utterly without precedent in the world of science. Yet, as you explain it, it seems logical and comparatively simple. But there must be inconceivable difficulty in constructing apparatus to differentiate properly between cells and to allocate the charges correctly."

"It was an enormous task. But Ainsworth, as you know, was particularly expert at that sort of thing."

Canas was restless and an inhuman moan escaped his loosely parted lips. Jerry carefully dropped an additional quantity of ether on the surface of the cone that covered his nostrils.

"These supermen," said Tony, "won't they prove troublesome when their borrowed intelligence has deserted them?"

"No. They were extremely tractable before—you saw how I was able to handle Crom when he playfully attempted to run off with Miss Van Alstyne during your previous visit—and I expect them to be even more so after this experience. In fact—but we shall see."

When the instruments on the control board indicated that the operation was completed, Jerry shut off the power and the two men left the room to join Ward and Charlie, who were busily engaged in receiving the villagers as they arrived in the laboratory via the fourth dimensional process. Some little time would elapse before the patients recovered from the effects of the ether.

Palo and Brun were there in the laboratory and they greeted Tony cordially, expressing immediate interest in the progress of the first experiment. They even smiled a bit at the dazed and bewildered expression of two of their kind who had just arrived with their gibbering mates.

Alvin Crandall

TWO days later they returned to the hospital where the two patients had been removed to snowy beds. It was remarkable to observe the perfection to which the Grimaldi attendants of the ward had been trained, for the room was as faultlessly clean and orderly as in the finest of hospitals on the earth's surface.

Canas was breathing heavily and irregularly, rolling his eyes frequently in a slow return to consciousness. But the former mate of this superman lay quiet and still, eyes wide open and features drawn. But in those eyes there was the dawn of a new intelligence, and a puzzled expression had replaced the vacancy of a short time before.

"How do you feel?" asked Jerry gently.

"Oh, I'm so sick," moaned the patient. "Where am I?"

Talbot positively shook with excitement. "Perfectly normal," he whispered. "Just still upset from the operation. He'll be out of it in a short time now." Then to the patient, "Never mind just now, old man. You've been quite ill, but are now fully recovered. As soon as you feel a little better we'll tell you all about it."

Brun and Palo chose to keep watch over the two patients while Tony returned to assist in the laboratory. Jerry was here, there and everywhere, a whirlwind of energy. He marshalled his house force of trained Pithies and Grimaldi, and, partly by pantomime and partly in their own simple gutturals, gave them their orders. The castle was filling rapidly and there were rooms to be made ready for the new occupants, meals to be prepared, and altogether a great deal of extra routine work. All marveled at the tireless strength of the sick man.

After the lapse of several hours, they returned to the ward where the two patients lay. They found Palo and Brun in a state of great joy and astonishment, animatedly conversing with the now fully regenerated moron; and both were greatly elated over the results of the operation. Canas lay white and still, fully awake and apparently content. His erstwhile mate looked brightly at Tony when he approached the bedside, with Jerry a little behind.

"Who are you?" asked Tony.

"Alvin Crandall," replied the man, "and I recognise you from newspaper photographs. You are the television wizard, Anthony Russell."

Tony laughed. "Not exactly a wizard," he said, "but I am the 'television Russell' all right. And you are Crandall of the United Air Transport crowd?"

"The same. Glad to meet you, Mr. Russell."

"Me too," said Tony, glancing significantly at Jerry, who now stepped forward.

Crandall gazed doubtfully at Jerry. "You," he said, slowly, "you I am not so sure of. But I believe you are the leader of the gang who kidnapped a crowd of us in the subway."

He sat erect in sudden recollection and Jerry recoiled before the fierce light that flashed from his eyes.

"Where are they all?" demanded Alvin Crandall.

JERRY hung his head, overcome for the moment by his unaccustomed emotions. "More than two hundred are alive and—well, not exactly in the best of health, but all on the road to recovery. These will be returned to their homes."

"And the rest? What has become of them?"

Jerry stared for a moment, then dashed from the room without making reply. His punishment was greater than he could face.

"Come on now, Crandall," said Tony, "you must take it easy. You're not well yet by any means. I'll tell you the entire story and you must promise me you'll not hold too much resentment against Talbot. He is the sole hope of the remaining two hundred, and we must help him in the great work of restoring them."

Realising that he had overtaxed his strength, Crandall sank back to his pillows and listened in silent wonder while Tony repeated the sordid story of hatred, ambition and greed. His anger melted into pity and sympathy as Tony told of the malign influence of Ainsworth and the repentance and regeneration of Talbot since the death of the older scientist.

Canas now rolled on his side and stared at Crandall—Palo and Brun watching closely the while. Slowly Crandall began to realize that he had a room mate, a huge creature who was something more than an ordinary man in physique. He looked kindly and understandingly at his neighbor. Something seemed to pass between them, and then—a surprising thing happened.

"By George!" exclaimed Crandall, "it is the giant whose body I used while I was ill. Canas, by all that's good and holy!"

And, forgetting his weakness and recent nausea, he jumped from his bed and grasped the huge paw of Canas in his two hands, shaking it with all his might.

Canas smiled happily and closed his eyes in utter contentment.

Palo and Brun exchanged satisfied glances and hurried from the room to spread the news amongst the villagers who had arrived at the castle that the first operation was a distinct success.

Alvin Crandall had emerged with flying colors from the horrible situation which had, for a time, been thrust upon him.

Related Minds

TONY followed the two "orphans" soon after, leaving Crandall and Canas in a close and mystifying communion, a sympathetic contact that seemed to be entirely mental. It was a strange situation and one that he felt should be reported to Jerry at once.

He located Jerry in the laboratory and found him in a state of deepest dejection, watching listlessly and absent-mindedly as Ward and Charlie continued their labors with the new arrivals.

"Buck up, old man," he said, "Crandall has forgiven you."

"Do you mean it?"

Tony swallowed hard and turned his head from the expression of piteous appeal in Talbot's fine eyes.

"True as I'm alive. I told him the entire story, and he has not only forgotten his animosity but has agreed to help in the rest of the work."

Jerry beamed anew and the hectic flush once more filled his sunken cheeks.

"Palo and Brun are spreading the news," continued Tony, "so I imagine the rest will be ready shortly to undergo the operations. But there is something else I want you to know. Canas and Crandall have discovered one another and are apparently conversing without words—some sort of telepathic communication. It is the weirdest thing to watch!"

Jerry smiled. "Don't let that worry you, Tony," he said. "It's just about what I expected! And it is the very thing that may save us from further trouble with the supermen. You see, during the period of occupation of the receptive mind of the superman by the energies transferred from the unwilling donors, there were definite and permanent changes induced by those energies. While the actual activating charges have been returned to the minds they originally filled, they have left their influence behind in the form of reactions of essentially electro-chemical nature. These reactions are, of course, inalterably related to the original mind, and through them I expect to see marked influence exerted over the supermen by their former 'mates.' In the case of Canas it is quite natural to suppose that Crandall is now his 'control,' and can cause the former possessor of his mentality to do or say anything he desires. It will be extremely interesting to watch developments."

"Do you think the supermen will retain any memory of the knowledge they formerly possessed—second-hand, as it were?"

"I do, but probably only in the presence of the 'mate' or 'control.' Once they are definitely separated from each other, that memory will gradually fade, though there will always remain a certain set of impressions that will tend to definitely improve the general intelligence of our superman. The brain cells have been influenced by the company they have been keeping, so to say. Each separate cell, each faculty, has been living in hourly contact with a companion—a tutor—and permanent benefit can not fail to result."

"Shall we return to the ward where Crandall and Canas are?"

THEY found that quite an assemblage of villagers had arrived in the ward. A group of the super-people and their 'mates' surrounded the cots of Crandall and Canas. Palo and Brun had carried the news that brought them hither, and these two discerning orphans now grinned delightedly over the growing enthusiasm of their companions.

Tony pressed forward into the crowd, with Talbot close at his heels. Canas had risen from his cot and was facing his fellows, a light of complete satisfaction in his soft calf-like eyes. Alvin Crandall sat erect in his own bed and was laughing heartily over the ludicrous appearance of his unshaven face and unkempt locks, revealed to his gaze in a mirror held by one of the Grimaldi attendants.

"Ye gods!" he exclaimed, "get me a barber! Or, at the very least, a razor!"

Then he caught sight of Tony and Jerry and his face sobered instantly. "Say," he said, "it is the darn'dest thing you ever saw the way this Canas and I seem to be linked together. I'm a regular Doctor Jekyll and Mr. Hyde, it seems."

"What do you mean?" asked Jerry quietly.

"Telepathy. He is still a part of me and I of him. His every thought runs through my brain whenever I look at him, and I can control his actions and speech as if I had him hypnotised. Unless I will the words into his mouth, he can not speak English, though he has a language of his own. Yet he can communicate his thoughts to me by merely touching my hand or gazing into my eyes."

"Just as you predicted!" exclaimed Tony wonderingly, eyeing Jerry.

"Yes," agreed Jerry, "it could hardly be otherwise."

"Watch!" commanded Crandall, turning from them to the elated Canas.

Something passed between the former mate and the superman, a wordless communication that altered the expression of Canas' features remarkably. The superman spoke, and in his accents and expressions there appeared the mannerisms of his control.

"I am entirely satisfied with the experiment," he said, "and I strongly urge my comrades to carry on as we planned. These words are put into my mouth by Alvin, for I don't know your language. But the thoughts are my own, and he helps me to speak them. The pain has gone

from my mind as it has from his. We both know he will be restored to his family, and, oh boy, aren't we glad?"

That final remark brought a chuckle from Tony. Imagine a synthetically developed superman indulging in good American slang!

But Crandall continued with his demonstrations. By sheer force of will he caused the delighted Canas to recite the multiplication table, the first paragraph of Caesar's Gallic War, "*Omnia Gallia est dieisa in partes tres . . .*" and put various other speeches into his mouth that could only have come from his lips as the result of telepathic communication. When Crandall withdrew his gaze from that of Canas, the superman grinned engagingly at the release, and uttered a few of his own simple gutturals that tickled his friend Brun immensely.

There was instant clamor from the surrounding villagers, each superman striving to be the first to reach the side of Jerry Talbot. He was overwhelmed by their insistant pleas for immediate treatment. A flush of excitement spread to his cheeks and there came a suspicion of moisture to his eyes.

"Going to have our hands full, Tony!" he shouted, gleefully, as he led the way to the operating room.

CHAPTER IX

Wholesale Rehabilitation

THEN followed many days of grueling labor, days measured in periods of twenty-four hours by Talbot's laboratory chronometer, which was maintained in accuracy by the radio impulses transmitted from Arlington—the only link with the surface world. But there were no regular rest periods nor meal times for the workers. It seemed as if they were continuously on their feet, though occasional intervals of sleep and allotments of food became imperatively necessary after the first forty-eight hours. Jerry was a human dynamo. He was tireless, and the suspicion grew on his visitors that he never slept at all. He appeared to live on his nervous energy, buoyed up by the certainty of the great measure of happiness he was restoring to those from whom it had been so ruthlessly taken.

Tony and Ward assisted him in the operating room, and the many patients were turned over to Charlie and Alvin Crandall as fast as the operations could be completed. All the villagers had been returned to the castle, and, as the results of the regeneration of their fellows became apparent, the later arrivals waited anxiously for their turn. In some cases the operation required considerably more than the average time of two hours, this depending on the physical condition and mental retentiveness of the patients. Three of the ten mechanisms had broken down and it thus became impossible to turn out more than four to six patients during each working hour. Still the wards filled rapidly and the Grimaldi attendants had their hands full, as did those who directed their labors.

As Alvin Crandall had depended upon Canas when bereft of his reason, so now Canas depended on Alvin. He followed him about as a faithful dog follows its master, and was utterly subservient to Crandall's will. The two could not be torn away from their self-imposed labors, though Jerry insisted that all others of the patients be kept strictly in bed for seventy-two hours following the operation.

As the first of the patients were permitted to leave their beds it was observed that the situation existing between mental mates was the same as in the case of Alvin and Canas. There was universal jubilation, and the long-nursed grievances against Jerry Talbot evaporated. The few remaining morons were objects of pity and were shown every consideration, not only by their mates but by their regenerated companions as well.

With the exception of Palo and Brun, the few orphans were kept well hidden, the morons among them being cared for by the supermen even though there were no definite mental ties. These morons presented the sole remaining problem. The visitors to Subterrania did not like to think of them and carefully refrained from mentioning the distressing situation to Jerry.

At last the operating room was cleared, save for a single remaining couple, a Junoesque superwoman and a slip of a girl that lay on the adjoining table. The last operation was nearing completion and soon a happy maiden of the upper world would awaken to new-found happiness, a superwoman to blissful contentment. Jerry sighed as he shut off the power.

"Glad it's over!" he declared.

And Ward and Tony saw that he was suddenly very, very tired.

"Better get some sleep, old man," observed Tony.

"Guess I will." Talbot tottered and would have fallen had not Tony caught him in his arms. "The old machine's just about worn out."

Gently they led him to his quarters.

Olaka Aroused

THE Pithies and Grimaldi, for all their ferocious appearance and their savage mentality, were peace-loving creatures. A considerable number of them, whose tasks kept them in the castle for long periods of the waking hours, were in the habit of returning to their families in Olaka for the sleeping times customarily observed. In this way news of the strange happenings in the house of Talbot, their god, became known throughout the city and formed the principal topic of discussion in their simple conversations on the streets and in the great communal gathering places. An undercurrent of restless excitement pervaded the city and was spreading gradually to the smaller centers of population.

Unable to understand the meaning of the sudden return of the supermen and their queer companions to the castle, the simple minds of the natives pictured this as an invasion of the domain of their lord and master. Ghorka—their name for Talbot—he who had ever been the more considerate of the two gods—he who could fly through the air like the beasts that had saved Olaka from the brontosaurians—he who had taught them to live more comfortably and to construct the shelters of their city—was in trouble! Ghorka was weak and in pain! He was in danger at the hands of the supermen and of the unwelcome visitors from far away! A smouldering indignation consumed the groping minds of the ape-men and burst into flame when it became known that Ghorka had taken to his bed and was in the throes of some evil spell.

Many hundreds of those who had been hard at work on the reconstruction of the huts that were trampled upon by the huge creatures from the cavern of monsters were now gathering in the paved area before the castle. Their numbers continually increased, and, though they were at first orderly, an ominous ripple of threatening murmurs spread throughout the assemblage, increasing in intensity as time passed. The Grimaldi, on account of their greater physical perfection and higher mentality, took the leadership. They had always been secretly jealous of the supermen, since the work of the two scientists had resulted in so marked an improvement in those second experiments in artificial evolution. This envy was now brought to the surface by the seeming alliance of these higher creations with the clothed beings who roamed through the house of Ghorka.

INSIDE the castle the jubilation and merry-making of the rehabilitated patients was tempered by the gloom that

pervaded the floor on which were Talbot's quarters and those of the visitors from the upper world. The unrest outside was not without its effect on the Pithis and Grimaldi attendants within. These began to desert their posts as soon as it became evident that all the patients had fully recovered, and that Tony and his companions were assuming charge of affairs.

"Things look bad for us," remarked Tony as he and Ward left the bedchamber of their host. "Jerry is failing rapidly and the natives are on the point of an uprising. We may have a lot of difficulty in getting our charges to the surface."

"Yes. I've been thinking of that a great deal. But, somehow, it has seemed inconsiderate to speak to Talbot about the matter. He expects to recover."

"I know he does. Poor devil! It's only his bull-dog grit that's keeping him alive now. He wants to see the whole thing through to its bitter end and then stay here to die among the ruins of his former ambitions. He sure is a bear for punishment! And this punishment is self-inflicted."

Doctor Morris, one of the restored victims, who had been giving Talbot the only medical attention that was available, now approached them where they stood in the corridor, not far from Jerry's door. He was fresh shaven and wore one of the regulation uniforms of white duck which had been previously supplied to hospital attendants by the two scientists. The ragged and filthy remnants of his former clothing had been discarded and burned as had those of all his kind after they recovered from the psycho-transference operations.

"How did you find the patient?" he inquired.

"He is sinking fast, Doctor," replied Tony, "though fighting to keep going. Was there another hemorrhage while we slept? He evaded the question when we asked him."

"Two, Mr. Russell. And if these continue he can not possibly last for more than a very few hours."

Jerry's nurse, a woman of the Grimaldi who had remained motherly and faithful, came hurrying out from his room and approached the three men, gesticulating excitedly and pointing at Tony. He was wanted in the sick room! They followed her to his bedside.

Talbot's Instructions

"YOU wanted me, Jerry?" asked Tony, noting with alarm that the sick man was looking much worse.

"Yes," panted Talbot, hastily concealing a blood-stained square of gauze. "I find—I am not—so strong as I thought. I've given up the struggle—can't carry on, old man. And there still remains the problem of returning the two hundred and six humans to their homes. Have to leave it in your hands. Sorry."

"That's all right, Jerry. We'll take care of everything. Only don't give up. Keep on fighting! You've overworked that body of yours something fierce ever since we came here, and now the reaction has got you, that's all."

"Don't try to kid me—Tony! I know you mean well—you're doing your best to cheer me up. But I know when I'm licked. Time's pretty short now, Tony! And I must tell you of my plans. You may have trouble in getting back. I haven't told you of the secret passage, but—"

Jerry's speech was cut short by a spasm of coughing which he attempted to restrain but could not. Doctor Morris shook his head gravely and placed a finger on the pulse of his patient. The nurse fidgeted and fussed as Jerry waved her away.

"This passage," he continued, when able to speak again, "is your sole means of reaching the upper world without superhuman effort. Ainsworth and I concealed it when the castle was built. It leads from one of the sub-basements to a small natural cavern, where you will find one of the gravity-repelling lifts that will carry you to within a few hundred feet of the surface. The rest of the way you must open through for yourselves, by means of the disintegration process. There's a map in the locked middle drawer of my desk that will show you the way. The key of the drawer is here."

He reached to the small table beside his bed and picked up a large bunch of keys. Indicating the proper one to Tony, he intrusted him with the entire ring. By his simple gesture in relinquishing them he showed all too clearly the completeness of his surrender to the inevitable. Ward and Tony turned away to avoid the look of pain in his dulling eyes.

"DON'T feel sorry for me, fellows," he whispered, "I surely appreciate your sympathy and the feelings that led you to heed my call for help. I can't thank you, but you'll get your reward in the satisfaction over the return of your people. Now I wish to make one final request."

His right hand strayed weakly to a hiding place beneath his pillow and brought forth a glittering instrument, one of the hand weapons that could hurl a body into the mysterious fourth dimension from which there could be no return after some five minutes of earth time. This also he handed to Tony.

"I'm no coward," he continued. "I'll die naturally, whatever the suffering. But after I've gone—this worthless carcass of mine I want removed. There must be nothing to remind your people that Jerry Talbot aided in the perpetration of a terrible crime against them. You saw this used before, Tony—you know how to press the button that will send my remains to join those of the many that were —removed—by Ainsworth and me. Will you do it?"

"I will." Tony found it hard to speak, for Jerry was pitiable in his weakness and renunciation.

"Thanks." Jerry closed his eyes and the unnatural flush fled from his cheeks.

They thought he had gone, but the white lips moved once more and they leaned close to catch his words.

"Those we removed—the several hundred that Ainsworth thought to be of unfit mentality for the experiments—did not suffer so much as those who remained—the finest of the lot. But they are irrevocably gone and nothing can be done about it. The orphans, too, can have no hope. But the Pithies and Grimaldi are at least better off than when they were discovered here. They will survive. But you must be sure to close off the opening when you have broken through to the surface. It is better that there be no further communication with Subterrania. Others from above might try to exploit it—might bring more misery to these poor creatures. Promise you'll destroy the ray-projectors and the map."

"We promise." Ward and Tony answered solemnly.

Jerry smiled. His eyelids fluttered but remained closed. "It is well," he breathed. "Forgive me, you fellows. And ask Charlie and Margaret to forgive me. I don't deserve it—but—I hope the world forgives—as—I forgave—Ainsworth. Tell—"

His fingers clutched at the covers, then lay still. His lips, still parted, were silenced. The stillness of death was in the room. The doctor bent over him professionally.

"This man is dead," he pronounced, straightening from his task.

Tony gulped once or twice and fingered the bulb of the instrument he held. Then, with sudden resolve, he leveled it at the still form on the bed and pressed the release.

There was a blinding flash, a crackling blue flame that rent the air asunder. The universe seemed momentarily

to totter. Talbot's bed was empty. His tortured body had followed the equally tortured spirit into the unknown.

Doctor Morris gasped his astonishment and the Grimaldi nurse rushed gibbering from the room.

CHAPTER X

The Castle Besieged

WITH the passing of Talbot, there came immediate demonstrations from the natives. The trusted servants, the ward attendants and all of the Pithie and Grimaldi occupants of the castle deserted en masse and, of course, carried the news to their fellows outside. The ensuing uproar amongst the multitude that now covered the paved area between the portal and the lake swelled to alarming proportions and Tony ordered the outer doors [illegible].

"They're sore all right,," said Charlie, who had rejoined his friends immediately after Talbot's death. "I'm afraid we're in for some trouble."

"Yes," agreed Tony, "something Jerry didn't count on. But I believe the doors will hold—they haven't any weapons, you know—and we should have plenty of time to get our gang away."

"Do you think the supermen will stay put?"

"I do. Palo and Brun will keep them in line. And besides, they understand the circumstances and are too happy over their release to oppose us. We must get out the map at once."

"Why not use the fourth dimension compression for the return?" asked Charlie.

"No!" objected Ward, "who'd operate it? Neither of us was instructed in handling the apparatus except to bring beings from another point. We wouldn't know how to reverse the process. Besides, after the rest were gone, who'd send us home?"

Tony laughed. "No, I guess Jerry had the right dope," he said, "and we musn't waste any time."

The map was soon located, and the three friends pored over its markings and read the directions that had been penned by Talbot. Suddenly Alvin Crandall burst in on them when they were in the midst of the examination of the chart. With him were half a dozen or more of the subway victims, all clothed in the white duck of the hospital attendants.

"Say!" blurted Alvin excitedly, "do you know that these ape-men outside are scaling the walls and have already reached some of the balconies?"

"No!" exclaimed Tony. "How did they do it?" He crammed the map into his pocket.

"Why, they can climb like the monkeys they are. They're making use of every projecting stone and ledge. We must have weapons!"

"No! No!" cried Tony. "There's been enough bloodshed and enough general hell raised in this place already. We'll get out of here without killing any of them! Are the balcony doors all bolted?"

"Yes, but some are not so strong as they might be."

"Come on!" yelled Tony. "We'll get busy at once!"

He rushed into the corridor, the rest following on his heels.

WORD was quickly passed to the men and women who had been snatched from one terrible fate only to fear now that they were facing another. Palo and Brun marshalled together the former mental 'mates,' the supermen, who prepared to defend the castle against the natives. They were easily influenced to this by their 'controls' and by the exhortations of the two orphans, who lectured them vociferously in their native gutturals. A guard of four of the supermen was placed at each of the balcony doors, and the remainder took up their positions in the great hall on the main floor. The orphan morons were locked in their quarters until such time as they could be properly attended to by their self-appointed protectors. The din outside increased in fury while the frightened refugees streamed into the hall and were sorted into groups of five for counting by Alvin Crandall and Charlie. Ward and Tony were busy searching for the sub-basement exit that was shown on the chart.

Then came a terrific blow on the massive outer door—such a blow as could only have been struck by an extremely heavy object hurled with mighty force. The natives had brought up a huge stalagmite and were using it as a battering ram! The blow was immediately repeated, this time with even greater force. The great doors could not long withstand such punishment!

The exit they sought had at last been located by Tony and Ward, and they re-entered the great hall just as the second blow of the ram caused one of the outer doors to splinter and partly yield. Tony took in the situation at a glance and shouted in consternation.

"Get them into the passage, Ward!" he cried, "I'll see what can be done here!"

A number of the women refugees had fainted and many were sobbing hysterically. Ward found his hands full in organizing them for the flight through the narrow exit. But with the able assistance of Charlie and Alvin Crandall, the retreat was soon under way.

Escape

AT the far end of the hall opposite the main entrance there was a raised platform, and for this point of vantage Tony rushed, with a large suitcase and the two ray-projectors in his hands. Hastily opening the case, he connected the leads from the smaller of the two instruments and started the generator. He had barely completed the connections when one of the doors crashed in and the natives came streaming into the hall by the hundred. There was a terrible screaming and chattering amongst the ape-men—then a roar of rage, as they saw the supermen lined against them and the refugees vanishing through an open door at the rear.

"Remember—no killing!" he shouted to Palo and Brun. And their booming voices could be heard in guttural commands as the ape-men rushed the defending line of supermen.

With the rifle-like projector held ready for instant use, Tony watched as the supermen gave way before the vastly superior numbers of the ape-men. They were at a great disadvantage due to the orders they had received. They must not kill! Yet how else could they stem the tide of these mad invaders?

Tony raised the weapon and pressed the release. A roaring pencil of dazzling flame shot over the heads of the milling combatants and through the demolished door. Attackers and defenders alike paused in their efforts and gazed in open-mouthed wonder at the figure of Tony, where he stood on the platform. Silence came like a sudden lull in a storm, and Tony saw out of the corner of his eye that fully half of the refugees had passed through the entrance to the basement retreat.

"Palo—Brun!" he called. "Tell them in your own language that I'll burn them to cinders if they don't leave at once!"

But the combat had been renewed before his gallant friends could comply with his request. Again he pressed the release of the energy, and this time the flame roared just over the heads of the natives. Striking the edge of the portal where the door had been torn away it burned

through the solid masonry in the twinkling of an eye. So terrible was this flame that the ape-man fell back in confusion and the voice of Palo rose loudly in sharp command.

The attackers halted and listened in sullen silence while he harangued them in their own simple syllables. When he had finished he stood facing them with majestically folded arms, Brun at his side. They hesitated a moment, and then commenced a disordered retreat.

Tony drew a breath of relief. The last of the refugees were passing through the doorway into the passage.

"Palo!" he called once more. And that loyal "orphan" sprang to the platform at his call.

Tony thrust his weapon into the hands of the giant leader of the defenders. "Thanks, Palo!" he said. "You've done nobly! And now I'll follow the others. I know I can trust you to keep things in order after we've gone. I want you to stand guard here with the flame projector. I'm going to take the generator with me, but they won't know the difference. And they don't doubt your assertions, if you find it necessary to threaten them anew. But I feel it won't be necessary. Good-bye now, Palo, and good luck to you all!"

He had disconnected the generator and closed the case, taking the larger projector under his arm.

"Farewell, Tony!" Palo gazed squarely and undaunted into his eyes. "You need have no fear for us! The ape-men will soon know the truth and will submit to the inevitable. Palo and Brun will see that the orphans are cared for until death. The rest—those of my kind—are able to care for themselves. Farewell!"

And Tony, with a renewal of that old lump in his throat, made a dash for the door through which his friends had passed. Bolting it securely behind him, he hurried through the damp passage to join his fellows in the sub-basement far beneath.

CHAPTER XI

Back to God's Country

EIGHT hours later an unusual sight might have been witnessed on a hillside a few miles outside the city limits of Chicago. But it was a lonely spot, off the main road, and, besides, it was past three o'clock in the morning.

So there were none to witness the sudden emergence of a number of white-robed figures from the side of a hill, nor to wonder as to the purpose of their gathering. Two hundred and six of them there were, in addition to three men in ordinary street clothes, who seemed to be the leaders of the assemblage.

Stranger still was the ensuing procedure. For a rectangular frame of dazzling light appeared on the solid rock above a gaping opening which had not previously existed. Its brilliant outline persisted for nearly an hour, until, with a heavy crash, many hundreds of tons of rock caved in to seal the opening beneath.

True, certain early risers in a nearby suburb thought they had felt the shock of an explosion or of a mild earthquake. But, beyond that, there was no evidence of the return of the adventurers and of the subway victims from the realm of Subterrania.

Dawn was breaking when Tony smashed the ray projector and its atomic motor-driven generator. He had sworn his followers to secrecy regarding the location of the spot at which they had arrived, though agreeing that all other details of the adventure might be related. They would have sworn to anything just then! And besides, there was little likelihood that anyone would ever attempt to make the trip to the underground region, even though the secret leaked out. But Jerry's wishes had been followed to the letter, and Tony was satisfied.

"Gosh!" he exclaimed, "I'm glad that's over!"

And the overjoyed group of humans, who had been saved from a fate worse than death, started their pilgrimage toward civilization. They cheered when the disc of the sun first showed in the east. It was good to see it once more! And some of them went down on their knees in thankfulness.

In a few hours the news broadcasts would have a marvelous story to spread throughout the world. The private radio conversations would be many and long. Many, many families would be made happy by hearing again the voices of their loved ones who had been mourned as lost, and by seeing their features in the viewing screens of their television receivers. And some apologies would be due to Tony and Charlie, along with the plaudits that were bound to come.

"Man alive!" grunted Ward Platt, as he and Tony trudged along, "do you know how long we've been away?"

"No. I've lost track of the time. A week?"

"Nearly two weeks, Tony. Our wives'll bawl us out for fair!"

"You said it! Me especially, and Margaret a bride of only two months. See! Our trousers out of press!"

They laughed gleefully over the absurd imaginings. And their laughs were echoed by the more than two hundred followers as they set a rapid pace for the march to the nearest town.

A bend in the road showed them the distant sky-line of Chicago, and they sobered at the thought of the welcome they would be accorded in the great city of the middle west. They were very tired. But their followers continued to cheer and sing—some of them, particularly the younger women, mingling tears of happiness with the laughter.

"Poor devil—Talbot," muttered Tony, thoughtfully.

"Yeah. Poor Talbot," puffed Ward Platt.

And Charlie echoed the sentiment.

THE END.

"It Was the Most Terrible Weapon of Warfare Ever Devised."

This was the consensus of opinion on the devastating invention of Professor Bloomsworthy. By means of it the tides of battle. . . .

Read about it in "The Flying Buzz-Saw" by H. McKay in the April issue AMAZING STORIES.

Cosmic Trash By BOB OLSEN

$300.00 Prize Contest

PREPOSTEROUS enough was the sight which Rodney Close saw on that momentous day, but even more astounding to him was the utter unconcern of the other people who witnessed it.

To Close it looked as if something dreadful was about to happen. If not that, it certainly was an event of grave portent. Yet the only ones besides himself who seemed even remotely interested in the dire happenings were an officious-looking individual in a green uniform, and seven loafers—the kind of bipeds who sometimes stand for hours watching a steam shovel excavating a hole.

What Close saw was this:

Hovering directly overhead was a formidable-looking monster, reminding him of a discus (such as are used in athletic contests) but of colossal proportions. So enormous was this outlandish contrivance that, even in its almost vertical position, it shrouded several blocks of the city below with its dense and ominous shadow.

As Close watched in open-mouthed astonishment, four long, sinuous, tapering arms like the tentacles of an octopus glided out from a protuberance at the side of the disc and quickly wrapped themselves around a towering edifice, just under the machine.

Close recognized it as the Woolworth Building. With no more effort than an elephant tugging at a sapling, the metal tentacles grasped the building and tilted it gently to one side. There was a splintering noise as the edifice was ripped loose from the pavement in front of it. Like something alive, one of the tentacles writhed through the crack formed between the wall and the sidewalk. Then two shafts of greenish rays shot out from tubes near the center of the disc and the machine began to rise.

When the flexible arms holding the building became taut, the upward motion ceased for a moment, then with a mighty heave, accompanied by the deafening sounds of cracking concrete, the entire edifice was wrenched from its foundation and lifted into the air. Swiftly and silently it continued to ascend, until it was a mere speck in the sky above.

The seven loafers languidly ambled on their way, leaving Close standing there. His eyes were almost popping out of their sockets as he gazed dizzily at the great hole from which he had just seen the large building yanked out like a decayed tooth.

The man in the green uniform jotted something in his notebook and was just about to walk away when Close accosted him:

"Excuse me, brother, but this contraption I just saw—this building that was jerked out by the roots—do you know anything about it?"

"WHY, certainly," the official replied: "I'm the ground supervisor in charge of this job, here's my card." Close read:

COSMIC DISPOSAL CO.
New York, Paris, Shanghai
A. Junker, 7th Vice-President.

"Thank you," said Close: "I hope you will pardon me for not being familiar with your work, but you see I've been out of touch with the world for some time. Haven't read a newspaper or seen a televisor for ten years."

"For ten years?" Junker echoed: "Where in the world could you have been for that length of time, without learning about our Cosmic Disposer?"

"That's a painful subject and if you don't object, I'd prefer to talk about something else—this marvelous machine of yours, for instance. Would you mind telling me about it?"

"Glad to. It was invented in order to furnish a quick, economic way to get rid of large structures of various kinds which have become obsolete and useless. You probably know that, with the quick easy methods of transportation now in vogue, our industries and other business establishments have become decentralized and our large cities have been almost depopulated.

"This left an immense number of buildings and other structures which were not only worthless but, in some cases, menaces to public safety. It was imperative that most of these edifices be removed in order to make room for aviation fields, parks and similar desirable developments. To tear down a structure like the Woolworth Building, piece by piece, would be a terrific task. It would take too long and cost too much. So we conceived the idea of lifting the buildings bodily and carrying them off into space. To do this we simply applied the familiar principles used in spaceflyers. Did you notice the tubes which projected greenish rays in two different directions?"

"Yes."

"Well, those rays furnish the guiding force. They may be directed toward any planet or star in space. All they do is to intensify tremendously the gravitational attraction of that particular heavenly body for the Cosmic Disposer. You can readily see how this principle may be used for steering the machine in any desired direction and with whatever power it requires."

"I can understand that all right; but what about the mechanism that operates those four tentacles or whatever you call them?"

"Tentacles is right. If you paid close attention to the appearance of the Disposer, you must have noticed the concave mirror near the center of the disc. This reflects the beams of the sun, focusing them on the tube which protrudes from the center of the machine. A small, but powerful device inside this tube converts the sun's heat into electrical energy. This not only provides the motive power for the tentacles but is also used for generating the gravitational rays which you saw coming out of the two projectors."

1st Honorable Mention

awarded to
"Cosmic Trash"
By BOB OLSEN
215 South Le Doux Road
Beverly Hills, Cal.

Mr. Olsen, who is one of our popular authors, is 45 years old and has been writing since the age of ten. He is a graduate of Brown University, is married and has three children. He has been a teacher of science in the High Schools and more recently the vice-president of a large advertising agency.

WE present this story as our choice for the first honorable mention in the cover contest because it has a quality which is all too rare in science fiction stories, namely, [illegible]

Mr. Olsen, who is well known to our readers, never loses his perspective or sense of humor, and this has enabled him to take a theme that might have been hackneyed and put it into a new form and give it a new dress.

This story is not only well written, but has adequate science; and by the medium Mr. Olsen uses, the cover theme is simply and convincingly explained.

"SOUNDS plain enough," Close interposed: "But I still can't imagine what you do with a building after you have removed it from its foundation."

"That's the easiest part of the whole performance. All we do is carry it out into space until it is free from the gravitational attraction of the earth. Then we turn it loose, and it either shoots into the sun or is captured by whatever planet happens to exert the most attraction for it."

"And can you get rid of anything that way?"

"Sure! For instance, to-day our European plant is removing the Eiffel Tower. It ought to be on its way just about now. Suppose we take a squint through my portable telescope."

He produced a tube about ten inches long and in a twinkling had mounted it on a slender tripod. After a moment of adjusting and focusing, he said: "Here, have a look."

Close peeped through the eyepiece and was astounded to see a clear image of a disc-shaped machine. Gripped in its tentacles was a steel structure which he recognized unmistakably as the Eiffel Tower. He could also make out the more or less distinct outlines of the machine he had seen a few minutes previously with the Woolworth Building clutched in its mechanical embrace.

Even as he gazed in rapt fascination, he saw the tentacles unwind and release the great structure. Within a few minutes the building was lost in the dazzling glare of the noonday sun.

"That is certainly marvelous!" he enthused: "But are you sure you can use it to get rid of anything?"

"Never been stumped yet. We've carried as many as six battleships on one trip. I had to laugh at a friend of mine the other day. He was complaining because he didn't know what to do with an old gadget his grandfather left on his place long ago. I believe he called it a 'Flivver.' Funniest contraption you ever saw; used to crawl along the ground like an ant.

"I happened to have a job removing a factory building near his home; so I told him to tow the Flivver to the plant and run it inside. It gave us more trouble than the whole building. Our Disposer had hardly gotten outside the earth's atmosphere, before the Flivver crashed through a window and started back toward the earth. Luckily our men noticed it and gave chase. They caught it just in time to prevent it from dropping right into the middle of a fashionable bathing beach."

"That puts an idea into my head," Close remarked: "I, too, have something I'd like to dispose of—something I've been accumulating for about forty years—something I'd give anything to get rid of. However, it would be a very unusual job. I'm afraid it couldn't be done."

"You mean the expense would be too great?"

"No, not that. I have plenty of money and I'm willing to pay almost any sum. What's bothering me is, whether you will be able to handle the job."

Junker became offended: "As I told you before, we've never yet tackled a job we couldn't handle. We've disposed of the Brooklyn Bridge, the Chrysler Building and many similar structures without the slightest trouble. Just what is it that you want to get rid of?"

"Well, if you must know," Close replied: "A package of old safety razor blades."

THE END.

The Day of Judgment

By VICTOR A. ENDERSBY

2nd Honorable Mention

awarded to

"The Day of Judgment"

By VICTOR A. ENDERSBY

1104 Associated Realty Building

Los Angeles, Cal.

AN "engineer" of Suven hastened to council, color-spots glinting nervousness. Appearance: a balloon with cucumber-warts, these his organs of locomotion, and hands also. They were accumulators of static electricity. By increasing and decreasing charges, he moved rapidly, though jerkily. He was a light, aerial jelly-fish; there being no wind on his planet, its surface protected from changing temperatures by eternal cloudbanks. His "hands" grasped only magnetic materials; his tools were of that, his methods of work surprising. But he was very clever.

Eyes, none; his field of vision was a sphere, sight through the "ocellae."* No speech organs; communication by color-changes of sensitive spots plus organic radio-waves.

Reason for nervousness; council-summons likely meant a blasphemy-charge. We would find his idea of blasphemy queer; his religion was worship of Universal Life. Prayer and duty consisted of service to That in all forms. Blasphemy was pain inflicted upon any living thing. His race had not hurt with intent for ages. But there were mistakes, brought to the culprit's notice. This was the punishment: the guilty one being so uncomfortable with himself thereafter as to be pitied.

He heard with relief the Chief, who "said:"

"You know the affliction creeping upon Suven of late. Atavism—increasing irresponsibility, carelessness; now actual cases of knowing injury to others. Fortunately, as we find this becoming intolerable, our Ether-fists have found the source and the possibility of cure.

"As we know, the action of intelligence on matter—namely, thought—is electrical, generating wave-action in the various ethers.* There is a transmission of feeling as well as of thought-images. We find our ethers invaded by vibrations unknown since the Individualistic Age. We thought they might come from disease among us, until an origin was located in the direction of Urtellia.** Checking back along our orbit, this was verified. Thus, of late, pathogenic waves have reached us from that sphere, poisoning our minds. Perhaps an evil race reaches power there, or some moral disease may be epidemic. Mayhap a race of low evolution has reached such numbers that its mass effect is perceptible.

"We shall not allow animalization of our people. We could destroy all life there, ending the evil, but this would reduce ourselves to *their* level.

"You will therefore construct a machine to go to Urtellia, bringing back specimens of the intelligences there, with such of their products as may illuminate their natures. We will examine them, determining whether they are a low race to be directed aright, a curable diseased race, or a failure of nature beyond help, mercifully to be destroyed."

* * * * *

Extract from the *Evening Blare*, New York City:

SPACE-TANK DESCRIBED!!!

Details of Interplanetary Raid!

Nov. 8:—Following the news of the

* See Jules Farigoule's *Eyeless Sight*.

* See the Cazamail experiments.

** Our Earth.

VICTOR A. ENDERSBY

Mr. Endersby is a Civil Engineer, a graduate of Stanford University, class of 1916. He was a captain of engineers during the world war and is now engaged in bridge construction. Although he has published many scientific and technical articles, this is his first serious fiction effort.

loss of the Eiffel Tower almost at the same instant that the Woolworth Building was torn from the midst of New York City, Mr. John Bushby, noted mechanical engineer, has furnished the first coherent available account of the amazing cosmic outrage. It is hoped that Mr. Bushby's narrative will enable scientists to fathom these events which have shaken the confidence of mankind in its own destiny. Mr. Bushby reports:

"The day was exceptionally bright. My office window overlooked the scene, and as I was idly gazing at the Woolworth at the moment, the event flashed across my vision with an impact which seemed to short-circuit every faculty except the power of observation.

"A HUGE disc dropped into the street, causing pieces of pavement to fly; its lower edge met the sidewalk near the building, the other leaning against the opposite structures. Four tentacles ran out of portholes, whipping around the building. I got the impression that they were composed of series of electro-magnets built around flexible shafting. They heaved on the building, making it sway and crack, while pieces of concrete fell amid such screams as I hope not to hear again this side of Hades. With jerks, some of which lifted the disc away from the other buildings, they broke the foundations out of the ground.

"Meanwhile, I got a number of details. The body of the thing appeared to be of gold, from its color as well as from the weight needed for the effects. The rim appeared to be steel, where the red paint was scraped by the impact. It was beveled, containing portholes; some were capped with metal. One opened; a globular, knobby object appeared, withered in the sun, and fluttered to the street as the port snapped shut. (Analysis of the slight remainder indicated protein, the structural remains resembling a light jelly-fish. The sun effect indicates origin on some planet protected from direct sun-rays.)

"The tentacles emerged from embrasures set on the sides of a circular projection in the middle of the disc. As the uprooting began, two more came out, playing yellow rays from lenses forming the termini of the tentacles, and which closed the ports of the embrasures when the tentacles were indrawn. The rays produced instant unconsciousness in anyone struck. Those in the windows disposed of, the tentacles entered the windows, I suppose, for more victims. They must have transmitted sight also—maybe enclosing flexible periscopes.

"THIS took about three minutes, I think. With the building torn loose, two nozzles mounted on a standard rising from the center of the projection turned earthward, emitting a roaring, greenish-yellow jet, which lifted disc and building from the ground. The slender standard must have been of unknown metal to carry such stresses. As the thing rose, I saw more working details. The standard rose from a glass bell sunk in the projection, containing a boiling green liquid and surrounded by a parabolic sun-mirror. The disc had been kept oriented so that the sun fell into the mirror and, as it rose, the nozzles swung in various directions, shifting the disc until the sun-orientation became perfect. A sort of sweeper rotated around the standard, keeping the mirror clean and polished. Set in a rotating belt around the projection were a number of nozzles tangentially set in the direction of rotation. I think that these nozzles gathered material from space—calcium, perhaps, when outside the atmosphere—and that this material disintegrated or formed a new element in the bell, under solar action, acting as fuel for the lifting nozzles.

"Set in another belt on top of the projection, facing axially, were more ports; presumably to enable the crew to watch the tentacles.

"The disc rose vertically with increasing speed; becoming lost to sight in about ten minutes."

* * * * *

Two proud earth structures moved through interstellar space; the inhabitants in a state of suspended animation so complete as to enable them to survive the freezing of the cosmic [illegible]

Here sat the board of directors of a great company, frozen in desperate discussion of their exposed activities in the fomentation of international ill-will. In a luxurious suite elsewhere, a famous "clairvoyant" had been immobilized while delving through his records after the materials for another remunerative blackmailing enterprise. The president of a "tropical exploitation company" had been totaling his gains from the past year's sales of swamp lands to confiding widows and school teachers. A great financial clique sat in a frozen "huddle" which had been preparing a bear raid on the stock market, designed to precipitate the panic of the century. In another office, a prosperous merchant whose aging wife had furnished to his career the energy, will, and courage to push him to the top of the ladder, having availed himself of noon-tide seclusion, sat in an embrace with his "stenographer."

Scattered through the building, were men and groups soaked body and soul in chicanery, crime, hypocrisy, the doctrine of self first and self last; all voyaging to a tribunal which could search every thread of thought in living substance.

The solitary defense witness for the race lay on the machinery-room floor—a lame negro janitor—scientifically rated a "high-class moron"—who devoted time and hard-earned wages to the care of an orphan child of his own race; in the cells of his brain, his alone, predominated memories of sacrifices past, loving plans without thought of self, for the future.

What will the verdict be?

[illegible]

THIS story, picked as worthy of the second honorable mention, is noted particularly for the strangeness of its atmosphere.

Our author has given us a striking picture of what he wants to tell us. It is simple and yet it has that quality of suggesting much more than the 1,500 words portray.

As an engineer, Mr. Endersby has, of course, convincingly explained the scientific features of the cover.

The Menace From the Skies

By A. G. STANGLAND

3rd Honorable Mention

awarded to

"The Menace from the Skies"

By

ARTHUR G. STANGLAND

Box 964 Rt. 1

Astoria, Oregon

IN order to still any unrest in the minds of its citizens, the World League of Nations hereby releases the true findings of the Committee of Three (Sir James Ramsey, Dr. J. Middleton, and Dr. Ernst von Heidenreich) of what really happened in New York, Paris, and on the high seas of the Atlantic Ocean, to be published in all magazines and periodicals and spread abroad in every other possible manner.

* * * * *

At 5:30 p. m. on October 3rd, a great flat disc was first noticed in the dusky skies, apparently floating lazily over New York City. Little attention was accorded the novelty; many believing it to be a new type of aircraft being tested by some air transport company.

But, as it gradually dropped lower, radio communication was interrupted by a sharp, and continuous staccato roaring, and much of the city's electrical equipment ceased to function. A gentle breeze from overhead grew into a heavy wind, as the peculiar air

traveller descended. Suddenly, crowds gasped in amazement and then in horror, as they stood impotent witnesses to the sharp-angled descent of the machine to a point over the tall Woolworth Building. It hung motionless for a moment while the air below was turned into a veritable maelstrom. Then four long tentacles dropped from the periphery of a projecting inverted "bowl" below the disc, and entwined themselves about the skyscraper. Horror-stricken occupants streamed from the doomed building.

The wind now raged with a crazed fury, partially demolishing some of the neighboring skyscrapers. Its activity appeared to center at the circumference of the huge disc where blinding violet rays shot from thirty-two ports arranged symmetrically in groups of four.

PEOPLE in the streets reverted to instinctive impulses. Faced with this unbelievably strange sight, the fear of the unknown unleashed hidden superstitious dreads. Thousands acted like hunted animals, madly fleeing, with an insane light in their eyes born of the first human emotion—self-preservation.

Inexorably, the great edifice was slowly torn from its deep-planted roots. Water gushed from the mangled mains; high tension electric cables shorted and flamed, igniting the gas flowing from the gas mains. Once torn free of the ground, the stolen building was lifted high into the heavens. The aerial visitor and its victim vanished completely in the rapidly-gathering darkness.

A similar description would paint the visit of one of the rovers to Paris the next day. It selected the Eiffel Tower and made off with it into the deep blue overhead. Similarly, the *Bremen*, out of the high seas, was abducted and spirited away.

The entire world was amazed, stunned, frightened. Of course, everyone is quite aware of some of the most widely-spread rumors concerning the beginning of another world war, and the visit of some aerial monsters from another part of the earth. However, several days later an amateur astronomer, photographing the heavens for evidence of comets, discovered the three space rovers moving toward Jupiter. Following his startling discovery, the world was even more fearful lest the stellar visitors return to continue their depredations upon Earth.

Upon the advice and suggestion of our government, the following statement is offered as our explanation of the strange events.

"We have had many questions asked as to how the interstellar visitors could come upon our earth without one of the many thousands of amateur astronomers here discovering them. We do not know definitely; but it is quite possible that they stole upon us in the dark center of the earth's shadow, the umbra. It is simple geometry to compute the mean length of the earth's umbra, which happens to be about 900,000 miles. One can readily see that a body 1,000 feet in diameter could approach the earth within that distance with small chance of detection, due to the small angle subtended.

"Another question, contingent upon discovering the approach of the recent extra-terrestrial beings, contained the inquiry as to why sensitive radio equipment failed to pick up at least the peculiar hum of their necessarily enormous electrical power plants. Dr. Heidenreich's experiments indicate the positive existence of the theoretical Heaviside Layer. It is this layer of atmospheric atoms at a critical pressure and temperature, between sixty and a hundred miles overhead, that makes radio possible. Electrical disturbances in the ether can neither enter nor leave this earth-enveloping insulator, which really acts as a condenser of about 3,000 farads capacity.

"Upon examining the steel skeletons of the demolished buildings near the site of the unfortunate Woolworth skyscraper, it was found that the metal appeared to glow, although to the hand it was quite cold. The scintillations observed coincided very much with the results of the rays from the Coolidge tube used on granite and metals years ago. One is led to conclude that the means of propulsion used by the huge machines is in some way connected with a ray similar to that omitted by the Coolidge tube.

"ONE day after the last machine had disappeared, we picked up the three of them in the field of the 200-inch Hooker reflector; and thereafter followed their progress with the newly-constructed 400-inch electric eye of Filson, all the while wresting secrets from the stellar rovers. We have a motion-picture record of their journey in space.

"The assistants of Dr. Middleton were able to get a startling picture of the earth reflected in one of the ports of the celestial machine transporting the *Bremen*, and at the same time the other two immense travellers were caught by a photograph. The tall building was still intact, although cracked in places. This picture is considered one of the finest taken by the Committee, and was recently published without permission.

"The speed of the space rovers at first was comparatively low, no doubt because of swarms of meteors in the vicinity of the earth. Two ray projectors, at the end of supporting tubes rising out of a 'crater' in the center of the inverted bowl, were evidently used in clearing meteors from the path of the machine. Seventeen days later, however, the speed was very much higher. Signs of deterioration were noticed on all three earthly objects, and a day later all had disappeared from the tentacle clasp of the visitors. But we were unprepared for what followed.

"Following this event in their journey, their velocity jumped enormously. Spectroscopic studies of the machines at first showed the presence of an unidentified metal or alloy. But as the days wore on, we were amazed to witness the spectroscopic lines shift toward a lighter and lighter metal. Suddenly, the lines indicated incandescence. Gazing first at the spectroscopic screen, and then at the ground-glass 'eye,' we witnessed the transmutation of the metal machines into a cloud of incandescent gas.

"After much profound thought upon this peculiar fate of the space rovers, we conclude. We are quite unfamiliar with the true conditions of interstellar space. But, evidently, with the destruction of matter on the sun continuing unabated, certain powerful rays must be given off. Out in space, the interstellar machines were unprotected from the merciless, fierce intensity of the sun's radiation. The metal of the machines was slowly being transmuted as they approached the sun. And this gives us a slight clew as to the origin of the machines. If they were from any of the inferior planets, it is natural to believe that the beings would overcome such a danger of proximity to the blazing sun.

"And now: why did these space rovers come to our earth? Evidently not to conquer or plunder our world. Perhaps they were of such an order of intelligence that curiosity as to the form of life on this planet prompted their visit. The taking of the three immense developments of our civilization, probably was the act of souvenir hunters.

"We feel that we can state with perfect sincerity that there should be no further cause for any public fear.

The Committee of Three,
James Ramsey,
James Middleton, Ph.D.,
Dr. Ernst von Heidenreich."

Mr. Stangland is a junior in electrical engineering at Oregon State College. He is twenty-one years old; and is deeply interested in psychology, philosophy and astronomy, besides his chosen profession. He describes the most fascinating of his avocations as the "art of writing." He is the author of the "Ancient Brain" which appeared in the October, 1929, issue of SCIENCE WONDER STORIES.

MR. STANGLAND is the author of "The Ancient Brain" which appeared in the October, 1929 issue of SCIENCE WONDER STORIES. *He has written a very interesting story. His narrative is straight-forward and fits quite nicely within the length limitation of the story.*

There are no loose ends to this story. It follows completely from beginning to end, and yet it has a nice device which is found in much good literature; there is an element of doubt; we might say a question mark at the end.

THE END

An Adventure in TIME

By Francis Flagg

(*Illustration by Paul*)

"I found myself in an immense room, the furnishings of which are beyond my power to describe. Metal robots glided to and fro, performing strange tasks. . . ."

AN ADVENTURE IN TIME

By the Author of "The Land of the Bipos"

EVER since the publication of "The Time Oscillator" by Henry F. Kirkham in SCIENCE WONDER STORIES, *there has been a great controversy among our readers as to the possibility of time flying and the conditions under which it may be done.*

The present author, the author of "The Land of the Bipos," gives us in this effort a marvelous time-traveling story.

A characteristic of our modern generation is its intense interest in the future. What will our civilization be in 100, 500 or 1,000 years hence? How will some of our most pressing problems be settled? Mr. Flagg answers some of these questions with great clarity and with a picturesqueness which is peculiarly his own.

One might say that time-traveling stories fully serve their purpose by giving us a perspective on our own civilization and very often lending a new viewpoint on conditions that we have come to accept as inevitable.

There is little question but that the future will see an increasingly greater part of our work being done by mechanisms of one kind or another, and whether these mechanisms are the Mechanicals as pictured by Mr. Flagg or some other form of mechanism, they will undoubtedly relieve man of much of the drudgery that is prevalent even in our twentieth century life.

NOTHING is impossible. I want that fact to sink into your minds. A thing may not have come within the sphere of your own activities; it may even lie beyond the scope of your imaginations. You may never have personally encountered anything above the commonplace, the ordinary. But you can't deny the possibility of the incredible, or the improbable, befalling someone else. Please bear this in mind when I tell you of my own startling experience."

So spoke Bayers, Professor of Physics. He was a blond viking of a man in his early thirties, big, powerful, an eccentric in his habits, a fool—or a genius. None of us liked him very much. We thought him too absurd, too egotistical. He broke too easily through the stereotyped and the conventional in his methods of teaching. On the basis of the known, the demonstrable, he built up superstructures of theories that, to say the least, were wild and far-fetched. He allowed the thread of his discourses to wander into mathematical mazes.

To most of us his reasoning was absurd. For example, it was his settled conviction that one could travel in time.

"You do it for an hour when you walk two or three miles," he often said. "Why can't you do it for a hundred years? All you have to perfect is the *medium*." The phrase became a joke with us: To perfect the medium.

Ellis, teacher of English literature, often engaged him in heated arguments.

"What time are you going to travel in?" Ellis would say, jeering. "Our time, or the time it takes to travel in time?"

"What do you mean?"

"Why, you know that Dunn, in his *Experiment With Time*, shows the fallacy of the reasoning of H. G. Wells in *The Time Machine*. If you travel a few thousand years into the future, a certain *time* must be used for the journey."

"But Dunn is mistaken," said Bayers, "in thinking that this time to travel in time is a time separate from or above our own. If I walk a mile in twenty minutes, and then run it in six, has that shortened the length of a mile? Or conversely, if in a six-minute run, I equal a twenty-minute walk, has that set a six-minute time above a twenty-minute one? The idea is preposterous!"

"I suppose Dunn knew what he was writing about."

"Dunn! Dunn! Dunn was mainly concerned in setting down some hocus-pocus about dreams. Listen to reason, man! If I measure off five miles, and then cover only one of them, that one mile isn't something above the five miles, it is only a fraction of a given distance. If I set off a thousand hours, and travel it in one, that one hour is only a fraction of the thousand hours. It is not a time above it, or below it—it is just the *same* time. The whole mistake made by Dunn lies in not clearly understanding that there is no basic difference between time and space. A fiction writer makes this very plain in a fantastic story of his, *The Machine Man of Ardathia*, which I would advise you to get and read."

"Thank you," was Ellis' retort, "I don't read cheap, science fiction magazines."

I GIVE the above conversation as an example of the many heated ones which took place in the lounging-room of the Faculty Club. Bayers didn't visit it oftener than once or twice a month, but when he did he always held the floor. And we didn't like it. We didn't like him. You can't care for a man who will call you an ignoramus, a stupid dolt, on the least provocation—or on none at all. But when he entered the lounging-room of the Faculty Club that night, three weeks ago, we stared at him in amazement. Undoubtedly it was Bayers, but he looked different. There was a subtle something wrong about the man. His clothes fitted oddly, as if they were too loose at the shoulders and too tight at the hips. We all knew that he had claimed several weeks' absence from the classroom because of sickness, but as he had done that before, and for various reasons, none of us had believed him really ill. Now we felt remorseful. We crowded around him.

"Bayers," exclaimed Ellis. "What's the matter, old man?"

It was then, standing in his accustomed place to one side of the big fireplace, his hands buried in his coat pockets, that Bayers uttered the words with which this chronicle opens. His voice was the same old arrogant voice, though noticeably shriller, and his haggard sun-browned face wore a look of triumph as he told the astounding story, which, to the best of my ability, I have given below.

FRANCIS FLAGG

* * * *

I have traveled in time (said Bayers). No, you needn't look at me like that. I'm not crazy, nor am I sick and running a fever. There's nothing at all the matter with me—at least, not in the way you imagine. Do me the favor, if you will, to listen without interruption.

"As you all know, I have always been intensely interested in the phenomenon of time and its relation to space. To my own satisfaction, at least, I had evolved a mathematical system which reduced one to the other in such fashion as to give me great hopes of being able ultimately to con-

struct a machine that could travel into the past and the future. The plan of such a machine was taking shape in my mind, and I had already fashioned certain parts of it, when, one summer's day two years ago, in the course of a walk along the road about a half mile from my house, I witnessed a sight that filled me with amazement.

That portion of the road, as you know, is quite lonely in the late afternoon. The houses stand far back in their own grounds and are hidden from the casual gaze by tall hedges and the foliage of trees. A Parsons aero-sedan was parked in the driveway of one of those places opposite me, but the plane was empty and not a person was in sight. I had just come abreast of this parked plane when a flash of intense light shone for a moment into my eyes and half-blinded me.

At first I thought it was a ray of sunlight glinting from the metal or the glass parts of the plane, but this idea was quickly dismissed, for the plane lay where the sun could not reach it. Quite involuntarily I had come to a pause, and was rubbing my eyes to restore their normal vision, when I observed a peculiar thing about two yards in front of me, the height of my shoulders from the ground, spinning in the air like a top. When I first saw it, it was a blur, and I could see through and beyond it, much as one does in looking through the spokes of a rapidly whirling wheel.

But when the spinning motion slowed, the thing became opaque, solid, and finally fell to the ground with a distinct thud. I then saw that it was a machine, a strange contrivance, possibly two feet in circumference, though as a matter of fact it was neither round nor square. Needless to say, I picked the thing up (it weighed about fifteen pounds) and carried it home with me. I was greatly excited. Examination in the privacy of my laboratory verified the suspicion that had entered my mind in the first moment of its appearance: the strange contrivance was the model of a time machine!

Editha

YES, a time machine. What I had believed possible lay before me in concrete form. Why such a thing had come to me, who had always believed in time traveling, is a thing I cannot explain. It belongs to a mathematics of probability higher than any we know of.

Perhaps my own work on a time machine prior to this incident was just a sort of pre-vision, or "future memory" that so many psychologists now believe in. In other words, while working on my time machine, I may really have been existing on two time planes simultaneously. The parts I had already fashioned were here; and also those parts which I had been able to conceive of mathematically, but the construction of which had baffled me. There was the great central wheel, the principle that turned it, not outwardly, but in on itself. There was the magnetic battery kept constantly charged by the momentum of the wheel. And lastly there was the balance. . . . But why continue! Suffice it to say, that everything I had ever dreamed of was incorporated in the body of that model.

You may imagine with what interest I inspected it, to what almost painful scrutiny I subjected its most minute details. Though in my own mind I was assured that the machine came from the future—since no person or persons of the past would have possessed the knowledge of mechanics and mathematics necessary for such an invention—there was no date, no legend, no message of any kind to indicate the period of its construction. But in the small chamber designed for whoever would like to journey in the time machine, I discovered the photograph of a beautiful girl. Only the face was shown, with a portion of the neck. The features appeared to be set in bas-relief on a substance similar to that used in our tintype pictures of almost a century ago, giving the face, which was tinted in natural colors, a startlingly lifelike effect.

Yet when I ran my finger over the surface of the photo, I found it absolutely smooth, the apparent bas-relief being an optical illusion cunningly contrived. I have called the face of this girl beautiful, but that is a weak term to use. As a matter of fact, the look of her was vital, arresting—and it exercised on me a strange fascination. It is absurd to say that I fell in love with a photograph of a woman I had never seen; but it is only truthful to state that the thought came to me with overwhelming force, that here was the picture of a woman I could love.

The head was well shaped, the forehead low but broad, the eyes widely spaced. The eyes were sea-green, the kind that often become vividly blue under the stress of emotion. And as for the mouth, the nose. . . . Suffice it to say, I was enchanted! The ashen hair cropped close to the head, boy-fashion, the hue of the skin, swarthily brown, were piquantly attractive to me. Recollect that I am still a young man, ardent by temperament, responsive to female beauty even though I have a reputation for shunning the society of women. Consider the strange, the exciting, circumstances under which the picture came into my possession. Then you will make allowances for the fact that I wove impossible romances in my mind, that I began to dream. . . . Under this picture was engraved a single name which I deciphered to mean—Editha.

BUT my unexpected find did not make me forget the time machine. Rather it added to the energy with which I threw myself into the task of duplicating the model in my possession. Naturally, I dared not experiment with it, else it might slip away from my hands into an era remote from myself. Again, I had to handle it with care, to note with microscopic thoroughness the relationship of its various parts, lest I smash something irreplaceable, or be unable to put together again what I had taken apart.

But I will not bother you with the irksome details. It is enough to say that I finally reproduced a model of the machine, complete in every respect, and that it functioned. After that it only remained to build a time machine on a scale large enough to carry myself. Two months ago the contrivance was finished. I asked for sick leave and prepared for my unique journey, giving my housekeeper to understand that I was going away to the country for a complete rest, and that during my absence neither she nor anyone else was to enter my workrooms.

I made ready for the journey with some care. Clad in a stout hunting-suit, and armed with an automatic, I seated myself in the chamber of the machine and advanced the starting lever. Do not think that I was altogether easy in my mind at that moment. For the truth is that I hesitated for some time. None better than myself knew the danger that lay in undertaking such a trip. But eagerness to test the invention personally, to prove that my theories were sound, finally overcame whatever timidity I had. It was my intention to essay but a short flight at first, say a thousand years into the future, but naturally I had no means of knowing how fast the machine would travel in time.

Here I want to say that Wells' description of what a traveler would see from a time machine in motion is incorrect. Also the great fictionist makes no attempt to protect his time traveler from the action of friction. That is because he has no conception of what it is that ages the organism.

In my machine all contingencies were provided for. It had been impossible to reproduce the transparent metal

with which the walls of the chamber of the strange model had been constructed, so in its place I utilized a flexible glass of the strongest and most modern manufacture; thick yet clear, capable of turning, with a quarter of an inch of its thickness, the bullet from a high-powered rifle. Through this glass I viewed no such thing as a succession of nights and days. No blur of rooms, buildings, cities and civilizations rose and fell. The speed was too colossal. When I had started my journey I was conscious only of a sickening swoop, a moment of utter disintegration. Beyond that I experienced—I saw—nothing. Fortunately, the lever was set on the face of a graduated dial, the dial being separated into two zones by a straight line. At the head of this line, the end farthest from me, was the numeral nought. When the lever rested on this, the machine was at rest; pulling it back to its greatest capacity in the left zone would start it hurtling into the future, while pushing it over into the right zone would send it into the past. Under the dial, and controlling the lever, was a mechanism which, after a certain number of revolutions of a clock-like wheel, would release the lever and let it fly back to neutral. It was well for me that this arrangement existed, otherwise I might be traveling yet.

In the Thicket

UNDERSTAND, I was already traveling; I was already experiencing that sickening feeling of disintegration. Then the mechanism released the lever and I stopped. I stopped, I say; and for a breathless moment the machine and I hung poised in space. Fool that I was, I had started my flight from the second floor of my house. Sometime during the years between my start and arrival, the house had naturally been torn down, removed, leaving a wooded spot where the building had once stood. So the machine and I plunged earthward. But the branches of trees broke the force of our fall and we came to rest in the midst of a dense thicket. I was badly shaken, of course, but protected from any serious injury by the walls of the chambur. Nor was the machine damaged. Constructed as it had been, with the more delicate part of its mechanism housed in an all-metal body, it had crashed to earth without suffering any particular harm. I went over it thoroughly to make certain of this, and with an axe from the tool-box cut the branches and underbrush away from around and under it, until it rested more or less firmly on the level. Then, and not till then, did I pause to realize the uniqueness of my position.

At that moment I did not doubt that I stood in the future. I had started with four walls of a room around me, but the walls, the room, had disappeared. I had expected them to, of course, and yet in spite of my expectations, I was amazed and startled. Deep in my subconscious mind had lurked a mistrust of the actual working of the larger machine, a doubt about the amazing deductions of my own reasoning. At any rate, in that moment I was as much astounded at my sudden whiff through time as any of you gentlemen might have been. Only after a few dazed minutes could the truth come home to me—the incredible truth—that what the great mass of humanity had never even dreamed of, I had done. After a while, after I had appeased an unaccountable hunger with some cheese and crackers, and had drunk a thermos-bottle of coffee, I forced my way with some difficulty through the shrubbery, and so came into the open. I might remark that by the position of the sun, the hour was about noon.

The thicket from which I emerged appeared to be an isolated cluster of woods set in the midst of a rolling, park-like countryside such as you may see today, but with no houses in evidence. Congratulating myself that the machine was well concealed, and marking the spot as carefully as I could, I walked ahead, wondering, as indeed one might well wonder, what sort of people I could expect to meet. In about five minutes I reached a place where a long line of tall trees ceased, and from which it was possible to see the whole of the East Bay territory spread below. But the familiar city views were no longer there. Berkeley and Oakland had vanished. The Key Route Mole which used to run its long slender length far out into the Bay was gone. Gone too, were the Campanile Tower, the towering brick and stone of the Tribune Building, the trireme-like ferry boats plying the waters between the East Bay cities and the metropolis by the Golden Gate.

CHAPTER II

A Meeting

CHANGE, change! I had expected, of course, to see changes, but not this drastic sweeping away of everything familiar. The completeness of time's erasure stunned me. So might an inhabitant of prehistoric America feel if he could return and view the cities of our day, standing where his own rude shelters had once stood. For all I knew I *might* be that prehistoric person. For I was looking down on a marvelous city—yet one so different from that to which I was accustomed that it filled me with amazement. The buildings, so far as I could see them, were of gleaming white stone with flat roofs, set each one in the midst of green squares and clumps of waving trees. There was no attempt to be mathematical in the arrangement of them. They lay in a sort of picturesque confusion delightful to behold. No chimneys or ugly projections marred the artistic simplicity of their lines.

I stared, enchanted. The air was clear, untainted with smoke, but darting through it were what appeared to be vast droves of birds. Far off across the Bay, in the direction where San Francisco now stands, other white buildings gleamed; and in great layers, stretching across the water from the eastern shore to the peninsula, were black streams of the same birds, coming and going. So amazed, yes, and enthralled, was I by the distant scene, that it was some time before I noticed an immense building some hundreds of yards to the right of me and further down the hillside. It was open on all sides, the roof supported by great colonial columns. And coming towards me from its direction was a man.

Now I had expected to meet human beings. I had even expected to see them curiously garbed. Oddity of dress and customs I was prepared for. It wasn't the fact, then, that this man was strangely clad that startled me. No, it was the manner of his approach. He was clothed in a form-fitting garment of one piece. Attached to his feet were flat, almost disc-like devices resembling snow-shoes, and in his hands he carried a short rod evidently of the same metal. Yet it was none of those things that made me stare at him incredulously, doubting the evidences of my own eye-sight. It was the fact that the man was walking on air!

Yes, believe it or not, he was some ten feet above the ground, not gliding through space, not flying, but coming toward me with purposeful, springy strides. At that moment he looked not unlike the old Greek figures of Mercury, the god of speed. When he lowered over me, I saw that physically the stranger was even a bigger man than myself, gracefully built, with fine features, and skin as dark as that of a Eurasian. Then for the second time within the same minute my equanimity received a jolt. The being striding through the air was not a man but a woman!

IF I regarded with the utmost astonishment this strange woman and her mode of approach, she seemed no less

surprised at viewing me and my dress. She spoke, and somehow the language sounded familiar. Intuitively I understood the question.

"Who are you?" she demanded in a sweet, yet commanding voice.

"A traveler," I replied, "an American."

"American." She pronounced the word, but with an odd accent. Then, with a command I could not misunderstand, she started off and gestured for me to follow. Greatly excited, a little dubious, I did so. A few steps in advance of myself, keeping about a foot above the ground, she walked effortlessly, while I toiled in her wake and perspired under the hot sun. In a few minutes we reached the immense building which I have already mentioned. The roof, of some transparent substance, covered a single floor that was perhaps an acre in extent. In the center of this floor was a massive machine of some sort, with wheels ceaselessly yet silently revolving. What its function was I could not determine. A mechanical contrivance stood to one side of this machine, a robot-like device, gliding to and fro in front of a metal board in which was set a bewildering mass of dials, cogs, and switches. Evidently it was susceptible to certain words of command, for when the woman spoke it changed its occupation abruptly and advanced towards her, bearing an odd looking disc in extended "hands." In a low tone she spoke rapidly into this disc for perhaps a minute. Then, again commanding the mechanism, which returned to its former occupation, she motioned me to follow her to where stood a vehicle not unlike an automobile. That is, it had a body and four wheels, seats for several people, and a steering gear. But here the resemblance to a motor-car ceased. There was no place for an engine!

The front came up in a sheer curve, like the prow of an ancient galley, extending as a roof over the length of the car. The wheels had perfectly flat exterior rims uncushioned with rubber or any other kind of tires. On those wheels, setting out from the hubs and coming level with that portion of the wheel-rims touching the floor, were large replicas of the same flat devices that adorned the feet of the woman who walked on air. Still obeying my guide, and not without an inward feeling of trepidation, I climbed into this strange automobile, and we were away.

The vehicle ran across the floor and took off from the farthest edge of it, not onto a road or runway, but into space. For a moment I was guilty of clutching at my companion's arm, so startled was I. Then I saw that we were not falling but running as if down hill. The action wasn't that of an airplane gliding; it was that of an automobile rolling over an incredibly smooth road. There was a faint hissing sound, the slightest vibration of the seat beneath me; otherwise I could detect no indication of any motor. Set into the prowlike front of the car was a windshield, but even casual inspection showed it to be made of a peculiar glass. In fact I wasn't at all sure that it was glass as we know it. The instruments set in the face of a metal strip below the windshield were utterly strange to me.

But it was not chiefly the vehicle nor its manipulation that claimed my attention. For in a few minutes we were in the city itself and rolling along about twenty feet above the ground. Looking downward I could see no roads, no pavement such as we have ribboning our cities. What I had taken from a distance to be vast droves of birds now proved to be people and motor-cars using various levels of the air for their pathways. The sight was uncanny. Nor were there any business or shopping districts to be seen in the city below me. Every building was surrounded by flowers and waving palm trees. The effect was that of a thousand beautiful estates merging one into another without any hedges or dividing lines. Yet, thought I to myself, these people have machines, they wear clothes of a sort. Factories must exist somewhere, and workers. Even this Eden must have a drab industrial quarter, disguise it as the inhabitants may. You see, my mind was really envisioning things as they are in our cities.

The News is Broadcast

BUT the air-vehicle's flight, which I judged to be at the rate of forty or fifty miles an hour, gave me little leisure to indulge in such thoughts. Besides, from what was undoubtedly a radio receiver in the body of the car a low but distinct voice was continually speaking. Then I discovered that the language, which had sounded familiar, but which I had been unable to understand when my guide addressed me in it, began to be intelligible. I listened attentively to the low, clear voice, grasping the meaning of a phrase here and there, and suddenly enlightenment came to me. It was Esperanto* that was being spoken, the universal language that a few people are advocating today. For a year or two I had studied it myself and had corresponded with enthusiasts in Europe. That was before my interests veered into other channels. But the fundamentals of the language were still mine. However, this Esperanto to which I was listening had changed somewhat, had evolved as was to be expected. But in spite of modifications, additions, strangeness of accent, I began, though with difficulty, to understand most of what was being said.

"Station R1," said the low, even voice, "reports the discovery of a strangely-clad man in hills back of station."

There was a steady flow of language, the sense of which I could not follow; and then suddenly I heard the following words:

"The stranger is being brought to General Intelligence Division 27 for questioning. Interview will be broadcast visually and orally over—" There was a gap here—"All citizens who desire . . ."

I strained my ears to hear further, for the news being broadcast related to myself. But, at that moment, with a sickening downward rush like that of a fast elevator, the car came to rest within a few inches of a wide lawn surrounding a large building. I had hardly time to notice that mechanical devices were mowing and watering this lawn, seemingly without any human guidance, when my companion courteously led me through a wide open entrance into the interior of the building. I found myself in an immense room, the complex furnishings of which are beyond my power to describe. Silently, smoothly, what could be nothing less than metal robots glided to and fro, performing strange tasks. I stared at these marvels, fascinated.

There were no windows in the walls of this room, yet everything was bathed in the rays of the afternoon sun. Evidently the wonderful material of which the walls and ceiling were composed was pervious to the rays of light. It glowed, I noticed, with the hue of old rose and faint purple,—a glorious sight,—yet the room was cool. Either its temperature was regulated by some refrigeration device, or the heat rays of the sun were filtered out by the material through which the sunlight passed. Later, I learned that the latter guess was the correct one. It was possible, I discovered, through the control of mild magnetic currents within the stone itself, to shut out the infra-red** or heat rays of the sun, or to admit and augment them. But I am going ahead of my story.

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* Invented in 1887 by Dr L. Zamenhof. It contains 2,642 root words. Its vocabulary consists of words common to every important European language, spelled phonetically.

** It has been thought by many, even today, that if the long wavelengths could be "strained" from light the heat could be eliminated and "cold light" produced.

IN this vast and utterly strange room (and you can imagine with what amazement I viewed it), were nearly a dozen human beings, clothed in the same fashion as my companion and having the same golden-brown skin. All were heroically built, none of them being under six feet in height, and all of them were women. Yet these women were not awkward, being well proportioned, gloriously so, and beautiful in a fashion that had nothing to do with clothes or make-up. All of them wore their hair cropped short, man-fashion, and there was something dominant and powerful about their faces; something, yes, that came from a feeling of conscious strength and the habit of command. Involuntarily I thought of Amazons, that warlike race of women of whom I had read so much. But if these women were Amazons, they were a highly civilized and advanced variety. What, in this community, was the status of men, I wondered? Men, of course, there must be; but so swift had been our flight through the city, I had failed to note any.

The women were standing by what appeared to be a large flat-topped table. One of them, taller and more majestic even than her sisters, evidently a person in authority, spoke a few words, another pressed a button. Immediately what appeared to be a concave rostrum rolled forward and I was asked to take a seat immediately in front of it. Two metal creatures busied themselves with levers and dials. A large metal mirror set in the face of the flat-topped table suddenly became thronged with reflected images—of houses, people, air-motors, trees and flowers, all very minute, but rapidly growing distinct and clear-cut. At first I couldn't understand the purpose of this mirror. Then suddenly it came to me: this place was undoubtedly a television and radio-broadcasting station. The area to be served with pictures and oral news was being visualized in the mirror. I watched the reflections intently. On an infinitely smaller scale I was seeing the surrounding country, not only of the East Bay but of the Peninsula across the Bay. Not until the pictures were perfectly clear, and a certain radius assured, did the tall majestic woman begin to question me.

At this point let me state that the conversation which follows did not take place with the clarity and directness with which I am going to relate it. Questions and replies had to be repeated over and over again. For the most part I found it easier to understand what was being said to me than to answer. For the sake of brevity, however, I am going to give this, and all other conversations which take place in the story, without further allusion to the difficulties attending them.

"Who are you?" asked the majestic woman.

"My name," I said, "is Bayers."

"Bayers?"

"Professor Bayers of the University of California."

"California," said the woman slowly. "There is no place by that name in the world today."

"Perhaps not, today," I replied, "but in the past. . . ."

"Our history teaches us," answered the woman, "that in olden times this part of Arcadia was called California."

"It is from there I come," I said.

She stared at me silently.

A woman in the background, the one who had conducted me to the place, spoke suddenly.

"But how is that possible?"

"By traveling in time," I said.

"Time!" echoed one of the women.

"Perhaps," I said, "you don't believe that possible."

An Examination

THE majestic woman rebuked me with a look.

"We have long ago ceased believing anything is impossible."

Glancing at the intelligent faces around me, I could well credit it. The woman went on:

"We, too, have pondered the possibility of time machines. More than that, we . . . But now we have given up such labors."

"But why?" I asked.

"Because we want no men from the past entering our country and interfering with the rule of women."

The rule of women! What I had thought about Amazons came back to me. "You mean—"

"That Arcadia is governed by a matriarchate*."

A matriarchate! I had read Lewis Morgan's *Ancient Society*, and Friedrich Engels' *Origin of the State, Private Property, and The Family*, but these books touched on matriarchal forms of society of the past, while this was the future. Who was it that said all progress is a spiral, that history undoubtedly repeats itself, but on higher stages or levels? "What date is this?" I asked.

"Since the Change, 1001."

"I don't understand," I said. "What do you mean by 'Since the Change'?"

"Why," replied the majestic woman, "it means that one thousand and one years have passed since we women took over the power."

"And that was . . ."

"By the old methods of dating time, A. D. 1998."

So I had traveled over ten hundred and fifty years into the future!

"In my day," I said, "the men were the dominant force in society."

"Yes," said the woman, "but that was before the Great Conflict."

I thought at first that she meant the World War of 1914, but she said no, that the Great Conflict took place in 1963.

"It was principally men," she said, "at the head of nations, who started the ghastly slaughter. For years they had been talking and professing peace, while secretly preparing poison gases and deadly germ bombs. All the ancient countries hated and distrusted one another. France was jealous of England, England of the United States, and the United States made little of England and of Europe. Russia, under the Dictatorship of The Proletariat, talked of universal disarmament, but the criminal chicanery of imperial diplomats, the rival ambitions of at least two great powers to rule the seas, the insane desires to extend spheres of influence over this territory and that, made any real policy of disarmament unpopular.

"Japan wanted a free hand in China and had reason to be afraid of America. Germany was anxious to wipe out the rankling disgrace of an earlier defeat and to punish her victorious enemies. Oh! they were all mad, mad with envy, greed and hatred; and on August 1st, 1963, the storm broke!

"There were no declarations of war. Each group of idiotic statesmen thought they would take their enemies by surprise. Four score planes of the French aerial squadron, each carrying three deadly bombs, one of gas, one of germs, one of explosives, swept across the English Channel on a cloudy night, and a few hours later London, Bristol, Portsmouth and Liverpool lay in ghastly ruins. And while this work of destruction was being perpetrated, swarms of airplanes from the mother ships of Britain's Atlantic fleet, and from strategic points in Canada, swept in over the seaboard and across the border of the United States, and by morning New York, Boston, Philadelphia, Buffalo, and cities as far west as Detroit and Chicago, were wiped

* Originally, this meant a state of society in which the mother was the head of the family and all hereditary rights of succession passed from mother to daughter instead of from father to son. It was once popular among primitive peoples.

out. Washington, with all the government officials, was one of the first to be destroyed. In almost the same hour that the French air fleet deluged England with a rain of death, a German force of bombers assailed Paris, Marseilles, and countless other cities. Italy showered death on Turkey, and Poland on Russia, Japan raided the Pacific seaboard of the United States, destroying Los Angeles and San Francisco; and American airships visited ruin on the cities of Japan. Oh, the asininity of it! In a few fatal hours the work of the mad, plutocratic statesmen was done. No nation arose to claim the victory over other nations, because the great capitals of the world and the jingo rulers in them had ceased to exist. Millions of people perished from the corroding gases from which no mask could protect them, and from the virulent disease germs loosed by insane governments. All over the world they died, and where they died they rotted."

CHAPTER III

The Aftermath

I LISTENED to the woman in horror. The events of which she spoke were to take place but thirteen years in the future from the time of my departure in 1950. It was impossible to believe that they could occur.

"But you forgot!" I exclaimed. "What of the protection against air-raids, the use of anti-aircraft guns, and other weapons?"

The woman smiled pityingly. "Yes," she said, "it sounds incredible, but our histories tell us that people actually believed—were persuaded to believe—that such things safeguarded them. Weren't there, however, even in your day, writers—I believe you called them writers—who showed the inadequacy of such methods of defense?"

There came to my mind the names of various authors who had described the horrors of a war waged from the air, and of an article on that subject by that elderly prophet, Stuart Chase, that I had read in a recent magazine. It almost seemed as if the woman could read my thoughts.

"Yes," she said, "their gloomiest predictions were verified. Whole governments were wiped out. But that was really a blessing. Corrupt, fossilised in the strata of old traditions, their elimination was a boon to suffering humanity. The pity of it was that man had to pay such a terrible price for his freedom from them. However, in time the people recovered. Pestilence, it is true, swept through the various countries and decimated the inhabitants. But from a thousand cities that had been unharmed by the initial air-raids there radiated forces of succor and upbuilding. Ten, twenty years passed. You will have to listen to a History Record of those ancient times to understand clearly all that transpired. Suffice it to say, that at the cost of losing fully half the world's population, the people acquired the wisdom to outlaw war. At an international meeting held in Berlin, representatives of the masses pledged themselves to everlasting peace. Exploitation of virgin territory for profit—that insidious source of all past wars—was declared abolished. An international language was adopted as mother tongue of the citizens of the world. It was decided at this first world congress that birth should, from henceforth, be controlled, that an endeavor should be made to limit the supply of food, clothing, and other essentials to the demand, and that the more advanced countries, industrially, should use all their resources to build up and make self-supporting the backward ones. Under this program, negroes desiring to do so, both in America and other parts of the world, were returned to Africa. Those wishing to remain in America, were allowed to stay.

"Discrimination because of color was no longer tolerated. Within a hundred years the race problem of southern America ceased to exist. But with the settling of the economic and race problems, arose another, the sex question. Even before the Great Conflict, the women of Russia had begun to break through age-old taboos. Under the new régime of world affairs, they began to forge ahead and to show more actual ability than men. Loosed from the dominion of man, woman developed faster than he into a world citizen. At the first World Congress only a third of the members belonged to our sex. Forty years later women composed seventy-five per cent of that body. And in the year, After the Change, One, the membership was one hundred per cent feminine."

I LISTENED—and with what interest you can well imagine.

"You mean," I said, "that the women conquered the men."

"Not in the way you imply," was the answer. "There were conflicts, of course, conflicts of policy. Men, it seems, are too combative by nature to always conduct things wisely. In a few decades they began to bark back after the old gods. But, biologically, all women are mothers—of boys as well as girls. It was only natural, indeed inevitable, that they should eventually take over the running of the world, as long ago they took over the running of the household. The rule of the woman is then the rule of the mother who wishes the best good for all of her children."

She paused, as if she wished me to say something, but I remained silent. "I am giving you this outline," she said, "for your own future guidance. You realize, of course, that you have come into our midst to stay."

"To stay!" I echoed.

"Yes," she said. "It wouldn't be desirable to have people from the ancient times traveling through their future to visit us. With their archaic ideas of government, religion and sex, they would fill our now peaceful land with discord, and perhaps violence. For that reason I request you to tell us where your time machine is."

Needless to say, I thought quickly. If I spoke the truth, my only means of returning to 1950 would be destroyed. "I am sorry," I said, "but the machine has vanished."

"Vanished?"

"Yes, I became dizzy and fell from the car while it was in flight. Fortunately, I landed without injury to myself; but the machine has gone on—where, I do not know."

The woman spoke a few slow words to a mechanical servant. I watched, fascinated, as this robot manipulated a dial and depressed a lever on a small table that had run smoothly forward. In a small mirror, similar to the larger one, grew the reflection of a hillside. I recognized the spot where I had met the woman walking on air. Quite slowly, as the dial was turned, the whole territory in the vicinity of where I had landed was subjected to close scrutiny. My heart misgave me as I saw the clump of woods in which the time machine lay concealed. For a few nerve-racking minutes it was reflected in the mirror and under the gaze of a dozen sharp eyes. But fortunately the foliage was thick enough to render any view of the machine impossible.

"It is well," said the majestic woman at length, and so terminated as strange an interview as was ever accorded mortal man.

A Masculine Gathering

IT is hard (continued Bayers) to relate everything as it really happened. I have said before that so far I had seen no men in Arcadia. But after the audience with the majestic woman in the television-broadcasting chamber,

I was given over into charge of a young man, Manuel by name. Since this was the first male brought to my notice, I regarded him with some curiosity. He was swarthy, with smooth, regular features, was gracefully built, and clad and shod exactly as were the women, but with this difference, that beside them he was almost grotesquely small. In fact he was only five feet in height. Considering the almost giant stature of the women, this surprised me. I had expected the men to be at least as tall as the women. Manuel, I thought, must be a stripling. But no, he was full grown. Then he must be an exception to his brothermen. But I was wrong.

To my astonishment I discovered that all the men of Arcadia were within an inch of five feet. They varied, as individuals will, in features, stoutness or slimness, (though a fat person was unknown), but in the matter of height there was a startling similarity. To me, accustomed to regard man as the sterner and stronger sex, there was something almost absurd in this reversal of positions. Also, as the women had impressed me with their look of dominance and command, so did the men astonish me with their air of soft compliance and subjection. It was not a physical quality, for they seemed hardy enough. But they betrayed their inferiority by the manner with which they clothed their every act. I found this to be true of the great majority, but I was to meet others again.

With Manuel, I dined that night in the company of six of his fellows. They seemed to live in bachelor quarters. The serving was entirely mechanical, the food such that I readily recognized the meat and several of the fruits and vegetables.

"I suppose," I said, "that you raise cattle on a large scale?"

"Cattle?" queried Manuel. "Oh, I see! Pardon me, but the term is now obsolete. No, such barbarous customs as raising animals for food have been abolished."

"But this meat?" I questioned.

He smiled at my bewilderment. "It is synthetic. The laboratory and factory have replaced the breeding-pen and the slaughter-house."

"Then you have factories?"

"Oh, yes; whole cities of them! But we don't live there, of course.

I drank what appeared to be a wine of rare vintage and pondered his words. A man with a very high forehead took the conversational lead away from me.

"It is actually true, then, you come from 1950?"

"Yes."

"When men," he said with a sarcastic inflection to his voice and looking obliquely at his companions, "weren't the pampered slaves that they are now?"

"Val!" cried Manuel, warningly. The man seated beside him, one whose manner had impressed me as being almost girlish, caught him by the arm and choked, "For heaven's sake be careful! Do you want to be de-memorised? You forget. . . ."

"I forget nothing," cried Val. Nonetheless he stood up with a jerk. "I was joking," he said carelessly. "Think of living in an age when people wore such clothes as these." He laid his hand on a sleeve of my hunting jacket. Then in a whisper, with no change of expression: "Is there a place where we can talk?"

MANUEL led the way out onto the lawn. "No one can hear us here," he said.

Val looked at me bitterly. "A lovely state of affairs," he said. "It's got so one can't trust a mechanical any more."

"A *mechanical*!"

"Yes, a servant—one of the machines. They're all in tune with the women. Especially the new ones that are now being distributed."

Manuel read the bewilderment on my face. "There are devices for registering sound and making permanent records of it at Central."

"You mean that the machines . . ."

"Oh, yes. They're receptive to everything, and they're everywhere. In the walls . . ." He shrugged his shoulders. "And it's against the law to touch the machines. Besides, it's impossible to do so and not . . . But tell us about life in olden times. We are eager to hear you."

"There's nothing much to tell," I said. "Your books and histories must give you a pretty good idea of what it is like. But you forget that I'm absolutely ignorant of things as they are today. All this is strange to me. I'm curious to learn of your social customs and habits."

The man called Val laughed bitterly. "We live," he said, "and eat, as you see, with no voice in the governing of our lives."

"But you are free," I objected. "The average man of my day did not live in the comfort you have. You do not work, as they had to, for your bread."

"What means that freedom?" he queried. "Freedom is relative to a given state of affairs. As a matter of fact we are the creatures of the women, who treat us as toys and who refuse to take us seriously."

I could not help smiling. Once, back in 1948, I had attended a meeting at which a famous feminist had spoken, and her words had been identical with Val's, only she had been referring to women while the present speaker was alluding to the lordly male. He continued:

"It is true we do not work. The executive work of directing the *mechanicals* is the sole prerogative of women. They even hold we lack the physique or mental endowment for anything far removed from what we are allowed."

I gasped. "But if you don't like conditions at present can't you change them with the vote?"

"No, that's impossible. We shall never win equality through voting."

"Why not?"

"Because the women are bound to win at the ballot."

"You mean they cheat, that they do not count. . . ."

"No, the counting of votes is honest enough. The system by which every voter, male or female, registers his or her will, admits of no false manipulation. By means of mechanical devices in every home or public place, each person registers his own vote and counts every other. Trickery is impossible."

"Then I don't see. . . ."

"Oh, it's simple enough. For centuries now the mothers have regulated the birth supply of the country. They have simply kept the number of women in Arcadia higher than that of the men."

"But how?"

"That is their secret. It is common knowledge today that the sex of a child can't be determined by will or feeding. It is known on indirect grounds that the nuclei of the male and female are not exactly alike. The difference is in the chromosome; a difference that can be traced back to the time when a human being is a fertilized egg."

"Yes," I said. "That's what they taught even in my day. Altenburg wrote a popular book on the subject."

VAL nodded. "The mothers use a more scientific method than willing or feeding to determine sex. As you know, the fertilized ova are removed from the wombs of the mothers shortly after conception takes place. They are put in ecto-genetic incubators for bringing to birth. That the embryos in early stages of development are acted upon by certain subtle gases and rays which affect the

chromosomes is commonly believed. However that may be, more girls are delivered from the containers than boys. So you see that our boasted equality at the ballot-box is only a farce. The number of votes is determined at the incubators. Even if the men voted as one—which for various reasons they do not do at present—the women would still outnumber them. No," he hissed, "there is no way for the men to achieve their rights, save through revolution!"

The others nodded a solemn agreement. I saw that they were as one in this.

"Are all men of the same mind as yourselves?" I asked.

"No," said Manuel, sorrowfully, "the men are divided among themselves. Foolish as it may sound, many of them vote for the women and are seemingly contented with the lot of being pampered playthings."

"But our movement is growing nonetheless," said Val. "Even those who are supine, indifferent, or afraid to join us, are not so contented as they seem. Let us once make a successful bid for freedom and thousands of such will flock to our aid."

The old, old talk of rebellion, I thought sadly. Was mankind never to escape the need of its purging whirlwind? Here, where industrial slavery had been abolished, where seemingly no human being sweated or starved or went without the necessaries of life, where machines did all the hard and continuous toil, where the cities and countryside looked like paradises, where beauty and health reigned and want was unknown,—even here discontentment was rife.

"Have you considered," I asked quietly, "that violence may destroy all the blessings you really have? Believe me, compared to the age from which I come, your existence is that of gods. You asked me to tell you something of life in 1950. Very well. Right on the site of Arcadia great ancient cities stood—New York, Chicago, Berkeley, Oakland, San Francisco, and many others. Berkeley and Oakland were considered beautiful communities in my day, two of the loveliest in the United States of America. But compared to cities standing here now, they were drab and ugly. They had business districts where buildings of stone and steel lifted gaunt heights above paved, unlovely streets. The streets were mostly crowded and mean and dirty. Men slaved in the shops on those streets and in the business offices, underpaid, undernourished, shut away from sun and air. And those cities had factory sections where soot and smoke abounded, where squalid houses ran in dispirited rows.

"Men worked what you would call long hours in those factories and came home to sleep in those houses. They were underpaid and undernourished—though a great many thought themselves well off in comparison with other workers who did yet more laborious work and received still smaller wages. As it was in Oakland and Berkeley, so was it in San Francisco, New York, Seattle and Chicago. But the greatest tragedy lay, not with the men who had work, but with the thousands, and even millions, who could find no work to do. The right to labor was really the right to live—the right to love and have a home; the right to eat and be respectable. The prisons were filled with men who stole because they could not work, because they wanted more than they could get by toiling long hours, wanted luxuries that only the rich could buy. Learned men did mental gymnastics in trying to prove that crime was a disease. It was—a social disease. Fourth offenders against property went to prison for life. Great insurrections broke out in those prisons because of the harsh treatment, the poor food, the terrible, monotonous life, and the injustice of being penned up—in many cases, for desiring to have some of the money that a few squandered on wine and women, that millionaires hoarded up in banks and couldn't use. There were other factors, too, in the making of criminals—though practically all had their basis in economics—but what I have told you is sufficient. And on top of everything else we had wars and the threat of wars. Nations raged upon each other as rival gunmen did in Chicago and New York. Can you deny that the women have led you away from such evils, that under their guidance wars have been abolished, want no longer exists, that you are well-fed, adequately clothed and housed?" I stopped breathless.

CHAPTER IV

A Recruit

AFTER a silence, Manuel said bluntly: "What you state is true enough. No one denies the women have brought us where we are. Our contention is that the men could have done the job just as well. We don't ask to return to the conditions of your day, which were far from ideal. Nor do we wish to destroy the conditions we now have . . . save in one particular."

"And that?"

"Is to wrest the supreme control of government from the women and to share it with them equally. We don't wish to enslave them. We are resolved to have equality."

I nodded slowly. "Yet," I said (in spite of the sympathy I felt for him and his cause), "All women are mothers—of boys as well as of girls. After all, couldn't you trust to their mother love better than . . ."

Val laughed bitterly. "So they've been lecturing to you in that fashion already! That's what they teach us from childhood up—that the mothers know best how to govern for all. Mother love—" He choked, and then went on vehemently: "What love can a Mother have for a child she never bears, which is taken from her body as an egg and hatched out in a machine? Which she never brings up personally or knows from a thousand other children? No! we are not sons to the Mothers. We are a hostile sex they have taught their daughters to dominate and despise. Yes, all women for generations have been taught to regard us as inferior, mentally and physically. By a process of breeding, combined with some secrets they have learned in handling embryos in the incubators, the Mothers have stunted our growth while augmenting that of their daughters. Yes," he cried, "they have given us these pigmy bodies, all of a size, while endowing women with magnificent physiques! Shall we forget this? Shall we submit meekly till they actually begin to stunt our brains too?"

"Good Lord!" I whispered, "they wouldn't do that!"

"Oh, wouldn't they! What if I were to tell you that the more extreme factions among the women favor this very thing; they maintain that a male animal or even a male man* doesn't need any more brains than to eat and mate?"

"If you were to tell me that," I said tensely, "and it were true, then, by God, I'd be a rebel myself!"

And that is how I came to get mixed up in the movement of the Revolutionary Males of Arcadia.

I slept that night in one of the odd chambers of the Arcadians. Odd, I say advisedly, because the walls of those chambers were created and destroyed at will. The principle was the same as that employed by physicists of our day who used certain rays to veil a theater stage from the eyes of an audience while stage-hands were changing the scenes. Only this process with the Arcadians had been carried far beyond the experimental stage. The walls so raised were impervious to ordinary material bodies. In spite of the excitement of the last few hours, or perhaps

* In Esperanto a male man is a viroulo.

because of it, I slept soundly. The next morning Manuel brought me a suit of clothing similar to that worn by all Arcadians. I laughed when I first held the one-piece garment up to inspection. It was scarcely more than a foot in length.

"Surely you don't expect me to get into this," I jested.

He smiled. "Let me help you," he said quietly.

TO my surprise the material proved wonderfully elastic, stretching without difficulty or any inconvenient strain, though to one accustomed to more and heavier clothing the suit seemed inadequate. "I feel naked," I said.

"But doubtless quite comfortable," replied Manuel. "You see, this cloth is specially prepared. It insulates the body against sudden changes in temperature, keeping you reasonably cool in hot weather and warm in cold. The ultra-violet rays of the sun are freely admitted to all portions of the body, while infra-red are tempered, or if too intense, repelled entirely. Long ago we abandoned wearing clothes for fashion or vanity's sake, realising that a well-shaped and clear-skinned body is a pleasing sort of beauty in itself. What you are now wearing is an art and health suit."

I had to admit that, artistically, the one-piece garment was much superior to the shapeless pants and coats of 1950. Manuel fastened to my feet the metal, disc-like devices I have before noted. Closer examination revealed them to be quite broad on the bottom and punctured with a score of small holes, containing a small compact atomic motor that compressed the air beneath one and made it as hard and resilient as rubber. The short metal rod handed me was hollow, and at either end, like stoppers, were what appeared to be semitinted plates. The rod was fastened to the wrist by a flexible strap of metal. Three keys, red, white and blue, were at the end of the rod near the wrist, and there were other devices whose function I will describe later on.

"But how do the shoes work?" I asked Manuel.

"By means of broadcast power," he replied. "The rod is your pick-up instrument. I press this first red key—so. Do you hear the vibration? Power is now being received by radio. I press the white one. Feel the droning in your heels? Power is being communicated to the air-shoes. Now if I were to press the blue button . . ."

"I would fly," I said.

"Fly! No," laughed Manuel. "Who said anything about flying? You would generate beneath your feet a thousand pounds of air-pressure to the square inch. This creates an air road on which you walk. You can ascend any height you please by merely stepping higher, as on stairs; to descend, notice the white button can not only be pressed but pushed forward in this notched groove—so. Each notch represents a decrease of one hundred pounds in air-pressure. There are ten notches, as you see. Thus by lessening the air resistance beneath your feet you can descend as easily as you rise. But come! Let me illustrate what I mean."

I shall never forget that first lesson in aerial walking. You can't imagine the uneasy sensation of stepping on what is invisible. At first I was timid and unbelievably clumsy. In air-shoes one stepped differently, more from the hip. An aerial walker had to learn to balance himself, to poise the body so as to remain in an upright position. Several times my head felt lighter than my feet; that is, my feet went up faster than the rest of me. Once or twice my heels shot out and heavenward, and the air-pressure would have hurled me disastrously to earth if Manuel and others of my instructors had not caught and held me safely. However, I soon began to acquire the knack. The first day I achieved a fair balance; the second, I essayed a journey all by myself, keeping, however, close to earth; and on the third, I was quite proficient.

Aerial Walks

"BUT why walk," I asked one of my instructors, "when it's possible to fly? Have you no flying machines?

"Oh, yes," he answered, "but they are only used for traveling long distances, and for conveying freight to and from the mechanical cities. Since man does no physical labor any more, it is considered imperative he should get as much exercise as possible. Walking is one of the simplest and best known. Of course we have the aerial autos—you have seen them. They run on compressed air roads in the same fashion as our aerial walks. But there is an exhilaration about aerial walking that's lacking in the machine."

I already understood what he meant. The air was a springy road beneath one's feet. A walker had the luxurious use of his limbs, combined with a freedom of movement, a birdlike sensation of rising and falling, of being a godlike creature alone in space. And with such understanding there came to me the realization that the old roads winding over hill and dale, the dusty, winding ribbons of macadamized highway had gone forever. Man now made his roads as he walked; and when he ceased walking, the road was non-existent. Nay, it lay always under his feet, but nowhere else, and the elements could not destroy it; nor did he have constantly to worry about their upkeep. The wonder, the simplicity of such road construction could not but make me marvel!

During the course of my walks—it was on the fourth day—I bent my steps in the direction of what I had known as Fruitvale and San Fernando. Outlying districts, I noticed, were being intensively farmed. Fruit trees and vegetables were still being grown. I saw the busy figures of workers tending the checker-like fields and orchards beneath, but when I descended to hold converse with them I perceived they were not human beings but mechanical robots, working with a grim precision rather appalling to watch. It was difficult to believe them machines—and as difficult to imagine them anything else.

During those four days I also saw other things of interest. There were, for instance, the books, theaters and television devices of the Arcadians. But I shall speak of these later.

After dark on the fourth day Manuel signified I was to go with him on a visit. We crossed the Bay in an air-auto to the San Francisco shore, and then turned inland, finally stopping at a grove of great pines in which a light chamber had been erected. Perhaps fifty men were assembled in the big room. I recognised Val and several others that I had seen before. Manuel took charge of the meeting.

"Bayers," he said, "this is the Revolutionary Committee of The League for Masculine Equality. It represents directly some hundred thousand male citizens of Arcadia; and indirectly a half million more. Your coming has aroused a great deal of agitation among our membership. We feel that the time to strike is ripe. Our plans are made. If you will co-operate with us we are confident of success. I have brought you here tonight to tell these men whether or not you will be one of us."

I looked at the faces surrounding me. They were of all kinds and description, but all shone with one emotion—determination!

"Gentlemen," I said, unconsciously using that form of address, "I am a man. I cannot help but sympathize with you in your aspirations. I come from a period when men were pretty well the masters of the world. In that era woman was sexually and economically inferior. She occupied a similar position to your own, in that she was organizing and fighting for equal rights. But I also realize that

the women won their battle, ushered in world-wide peace among nations, created the marvelous civilization I see surrounding me, and I am naturally anxious no act of mine shall destroy the worthy fruits of their labor and genius."

"What do you fear?" asked one of the men.

"Violence," I said, "fighting among the sexes which will erase all your gains."

"Then be easy in your mind," said another. "No weapons such as the ancients used exist among us today. Gunpowder, explosives, deadly gases are not manufactured in our mechanical cities. Psychologically we are trained to abhor the use of such things, or any violence in fact. What we contemplate is not that sort of a revolution."

"Well, what other sort is there?" I demanded, consumed with curiosity.

MANUEL spoke slowly: "Bayers, it is natural for you to think in terms of your day, but try to understand what I am going to tell you. The whole basis of Arcadian life is mechanical. Nine-tenths of our work is done solely by machines. Those machines—and when I say machines, I mean all the devices you see immediately surrounding us, the vast cities of the middle-west and of the east that are wholly run by mechanisms—are controlled from certain centers by women operators. There is one master center that controls the whole life of the country, that commands the obedience of the *mechanicals*. Whoever controls this center has the power to enforce his demands: not by destroying anything, but by *possessing* everything. Once let us win this center and we can dictate terms to the women, make our demands on the mothers. We can force them to give us equal representation in the laboratories in the Secret City. We can ask certain securities for the carrying out of our wishes. Once we have control of this center, we can achieve equal rights for man."

"And you promise not to use your power to deprive the women of theirs?"

"Yes; for we realize that no ruling class or sex is safe so long as there is a class or sex deprived of its privileges, that is kept inferior. All must be equal."

"Very well," I said, "I am in sympathy with you so far. But what is your plan for seizing the center, and of what help can I be?"

Val answered me. "No male is allowed to enter this master center. Theoretically he is kept ignorant as to how it works. But actually, by what means does not matter now, we have obtained complete knowledge regarding it and how it functions. For any of us to approach it without suspicion is impossible. But you are a visitor from another age, physically as big as a woman. In the dark you can pass for one. See, here are the plans of the control center. Notice the seat here—and the lever." He spread before me a well-drawn plan. "The room is quite bare save for this." He indicated the sketch of a weird-looking mechanism. "But pay no attention to it. The woman will probably rise and come to greet you. That's your chance. Act quickly! Don't hesitate! Win to the seat—throw the lever. Leave the rest to us."

He illustrated what he meant; he went over and over the details painstakingly.

"When the lever is thrown this *mechanical* here will imprison the woman, but without injury. All over Arcadia power will stop, work will cease. No one will be hurt because the surplus energy stored in batteries incorporated in air-autos, air-shoes and air-ships will allow of their safe descent to earth. On that surplus we shall reach you quickly, once you throw the lever. Follow out these instructions to the letter."

So it was we made our plans and on the following evening attempted to carry them out.

CHAPTER V

A Midnight Walk

HERE I must note a peculiarity. With the abolition of roads as we know them, and with the use of the air exclusively, had gone the old-fashioned methods of illuminating cities. The need for lighting systems to prevent robbery or murder had practically disappeared. The bodies of air-autos, the air-shoes on the heels of aerial walkers, the controlling rods strung to the wrists of pedestrians were all of a uniform silvery color that shone at night like phosphorus. The air-autos, of course, could switch on electric lights if necessary, and I discovered that the pressing of a sensitized plate could turn my rod into an ingenious and powerful "torch." As for the interior of buildings and the temporary light chambers, the first were illuminated by artificial sunlight reflected from a central lamp in each building, wherever desired, by cunningly arranged reflecting devices, while the latter had the peculiar property of lighting themselves. This matter I intended to probe into more deeply when opportunity should offer, but somehow never did. The roofs of buildings were designated by symbols, letters of the alphabet, and by numbers etched in glowing phosphorus; so that a citizen knew where he was at all times and could readily locate places in the darkness.

"Why veil from our cities with superfluous lights the glory of the stars and the matchless beauty of the moon?" asked Manuel. I was made to understand that for all Arcadians, both male and female, the contemplation of the heavens at night was an aesthetic pleasure.

The central control station to which twelve members of the Revolutionary Committee guided me about ten o'clock in the evening was distinguished from other buildings by an immense circle enclosing the letter A. No attempt was made at secrecy. Numerous other walkers were abroad. In fact the air was full of traffic. We were but a group of men among thousands. But I myself could readily pass for a woman. My bulk was that of a female. In the soft darkness of the night—there was no moon—I was but a vague figure. The faint glow of phosphorus indicating shod heels and the rod in my hand revealed them alone. Walking through the balmy night on the aerial highway was a mystical and uncanny experience. Almost I imagined myself dreaming. Languorously I glided along. Like giant fireflies, air-autos went noiselessly by. Invisible feet on gleaming metal were everywhere. Far off you could see them striding, hundreds of them—thousands. The gleaming rods swung this way and that. Suspended betwixt heaven and earth I had an almost ecstatic feeling of exhilaration, of omnipotent power.

Where before had I ever experienced such emotions? Then it came to me that many times in sleep I had soared through the air, limbs trailing. Levitation! That was it. Through the machine man would master the mystery of gliding, of traveling without extraneous power. I pondered how the simple ever prevails over the complex. Then Manuel, who had glided forward, seized my arm and pointed downward. The great circle enclosing the letter A was directly underneath. The others crowded around. Not a word was spoken. Before starting, my instructions had been lucidly repeated and the rest was up to me. Further talk was useless—even dangerous. With only a nod of farewell I went down into the velvet blackness of the grove surrounding the shadowy building. I knew where to land, what preliminary steps to take, but for the first time I felt nervous. I was conscious of a rising excitement, a quickened pulse. To enter the building as a woman seemed easy enough, but after that . . .

WHAT if my attempt failed? What if, instead of the woman, I should myself be the one to be made a prisoner by the *mechanicals*? The thought was anything but pleasant. It came to me suddenly that I knew nothing of the laws of Arcadia, what methods of punishment were indulged in. Robbery and murder no longer occurred, or very rarely. Such cases were treated psychopathically. But what of revolutionists? Surely there was a punishment for the crime of rebellion. The phrase uttered to Val by the almost girlish man at my first dinner in Arcadia came to me. "Do you want to be de-memorised?" I should have asked about that expression. But it was too late now! With the emotions of a man who feels that he is running serious risks he should have had sense enough to steer clear of, I found myself pacing the air six inches above the lawn.

Mechanicals were still toiling but took no notice of me. They were laying out a row of what appeared to be shrubbery. What a blessing such workers would be to the greedy industrial interests of America, I thought. No wages, no strikes. A little cash outlay for machines, a little lubricant from time to time, the pressing of a button or whatever it was that started them, and the twenty-four hours could roll around without their noticing their flight. A blessing indeed to the farmer, the banker—but to the workers, the wage-earners of the United States, hardly a boon!

I entered the wide-open portal of the building without interference. My nerves twitched, my muscles tensed until they hurt. It occurred to me that I was not designed by nature for such dubious adventures. A soft, rosy light filled the interior of the vast room. It was a subdued light, though to one coming in from the outer darkness it was dazzling enough. In spite of my nervousness, my inward feeling of trepidation, I moved forward quickly. I saw the grotesque *mechanical* to one side, the desk with the lever above it, in the center of the floor. Everything was familiar to me, from the plans I had viewed, yet at the same time strange, as is the way with places when one has merely studied pictures of them. A woman was at the desk. She rose and came forward. Undoubtedly she took me for a fellow-woman. At least she gave no sign of alarm or distrust that I could see.

I blinked my eyes to accustom them to the light, and mentally rehearsed what I must do. Spring past the woman, throw the switch. All this in a swift procession of seconds, though it seems longer in telling. The woman neared. My heart beat rapidly. Now, now . . . But I never leapt. For all thought of action was driven from my mind at sight of the woman's face. Yes, her face! It was a lovely face, a well-remembered face, a face I had never expected to see in this life. There were the sea-green eyes that had haunted me in my dreams, waking and sleeping, the low, broad brow. Yes, there could be no mistake. It was the face of the woman whose picture I had found in the model of the time machine in Berkeley a week (or was it a dozen centuries?) before! All thought of my fellow revolutionists anxiously waiting somewhere in the velvet blackness above fled from my consciousness as I cried incredulously "Editha! Editha!"

Editha Again

AFTER those words (said Bayers) I stood staring at her like one petrified.

"You know my name!" she said.

"It was on the bottom of the picture," I answered.

"The picture?"

"The one the time machine brought back into time."

"Ah," she said, "then you must be the stranger, Bayers. You found the model I made. I couldn't help experimenting with it, though the Mothers forbade it. Was it my invention that enabled you to reach here?"

"Partly," I said. "It clarified certain principles for me. But I had been experimenting along the same lines myself."

She nodded. "The Mothers were right. They said the inventions of such machines would only open a gateway for those of the past to flow in on us."

"But is my coming such a terrible thing—to you?" I asked softly.

She frowned, suddenly seeming to recollect that I was a man and where I had no business to be. The opportunity was still open for me to spring past her and throw the lever, but for the life of me I could not bring myself to attempt such a thing. But my eyes flashing to the desk and back again must have revealed something to her discerning gaze, because she said, gently enough:

"You were given over in charge of Manuel. Manuel is a revolutionist. Those poor men! Bayers, I believe they sent you here to capture this place." And then as I stared at her, my face crimson, she went on: "That must be it, of course. You didn't come here by chance. They counted on your being taken for a woman because of your size. It was really clever of them, but the plan could never have succeeded."

"Why not?" I said, a little defensively. "Only the accident of my recognising you prevented me from . . ."

"Leaping for the lever," she smiled, "as doubtless you planned to do. Well, Bayers, I would have just stamped on this raised tile—so—and the lever would automatically have locked; and then—watch what would have happened."

She stamped as she spoke. The huge *mechanical* swung from the wall with inconceivable rapidity. From the lawn outside came the sudden shrill whistling of machines, the clang of metal falling. The wide-open entrance closed shut. She and I were alone in the central control room. Editha smiled slowly at my wide-eyed astonishment.

"The men," she remarked, "don't know as much of this place as they imagine they do. We see that all their information is—false. It takes quite another method to unlock the switch, return the *mechanical*, and open the doors again. You are a prisoner. *My prisoner*," she said, softly.

"And what is to be my punishment?" I asked, trying to speak lightly. She did not answer that question, putting one of her own.

"Are all men of 1950 as tall as you?"

"Not all," I answered.

"The men of today are so puny."

"It puzzles me to account for it," I remarked.

"I suppose they are just naturally smaller and weaker than women."

"How does it happen, then, that in my day men were, on the whole, stronger physically, and taller?"

"I can hardly credit that."

"It is true, nevertheless.

"But I have been taught . . . that is, I always understood men were inferior to us by nature."

SHE shook her head in perplexity. "It's nice, though, to see a man as tall as one's self. The other men have bored me so! You're as tall as I, aren't you? But are you as strong? Let me see."

She took hold of me, as she spoke, with her strong young arms and began to wrestle. The touch of her hands, the contact of her body with mine, ran through me like electricity. But I soon found that no spirit of play or flirtation animated Editha. She was like an aroused Amazon. Her eyes blazed with the light of battle, her face tensed. The breath came quickly through her tightly shut white teeth. At first I tried to be on the defensive only, but before I

knew it I was fighting back with every atom of my strength. It didn't take thirty seconds to make me realize here was no ordinary woman.

As you know, I am a heavy-weight amateur wrestler of some note. Three years ago it was even said I could give the champion his congé if I turned professional. In my day I've pitted myself against many strong men; but I can truthfully say I met none stronger or harder to handle than this beautiful woman of Arcadia. Her muscles writhed like whipcord. They tensed under my grip like iron bands. Not only her muscles, but her flesh was hard like iron, or smooth ivory. Twice she threw me to the floor, but each time I was on my feet again before she could make good her advantage. Once we met in headlong rush, and it was I who went back from the collision, almost bowled over. By this time every idea of chivalry to a weaker sex had been battered out of my head. Literally, I was fighting to save myself from ignominious defeat. The woman was more powerful, proving herself more than my match.

We met in a deadly embrace, and she wrapped her arms around me and squeezed. I felt my senses swimming, my ribs caving in under the awful pressure. Back I went—back. At that crucial moment I recollected a trick Hashiro, the Jap wrestler, had taught me. There was a nerve just above the small of the back that if a thumb pressed . . . Wildly, almost gone, I found the spot and with the remnants of my failing strength bored. Under my fainting grasp I could feel the spasmodic quiver of her lithe body. The grip of her arms relaxed. But I had no mercy. I had been too near the ignominy of defeat to feel anything but an exultant thrill of victory. Up I straightened, up, and it was she who now went back. The pressure on the nerve must have been excruciating and paralyzing, but like the born fighter she was, Editha fought against submission to the last. But fight as she would the end was now inevitable. Yet though her breath came in agonized gasps, her eyes glared untamed into my own. Over I bent her, over, until she sank nervelessly to the floor.

Then seeing her there, stretched helplessly beneath me, I remembered again she was a woman, and a thing to be desired. Perhaps the feel of her warm arms, the contact of her body with my own, had subconsciously wakened in me all the male in a man. However that may be, I suddenly leaned over and . . .

"Don't you dare!" she gasped. "Don't you dare!"

But in spite of her struggles I pressed my burning lips on hers. So we lay for a breathless moment, her body like tensed steel. Then suddenly with a little sob she went limp. Two arms came up around my neck. The blood sang wildly in my ears as my kisses were returned!

SO began my romance with Editha. The possession of her love was a wonderful, a glorious thing; and yet had I known what my fate was to be, I would have . . . But would I? The heart of a man is a curious thing. But I didn't know. Nothing warned me. So I went blindly on.

After that night I saw nothing more of Manuel or of any other member of the League for Masculine Equality. And, truthfully, I did not care. I consoled myself with the fact that I had betrayed no one. The plan had gone awry, that was all, and any further attempt on the part of the men to capture the central control station would equally miscarry. In mentioning the revolutionists, Editha only said: "You needn't say a word, but I know Manuel is in this movement and that Val is a leader. Someday, of course, we shall have to deal with them drastically."

"Imprison them?" I queried.

"Oh, no. There are no prisons in Arcadia."

"You don't mean—kill them?"

"Of course not! Won't you realize that we have left the dark ages behind? Life is sacred with us."

"Well, then," I said, "I don't see what it is you do."

"We remove subversive ideas from their heads by means of the dememorizing principle, and replace them with contented, placid ones. The effect usually wears off in time, in the case of really strong minds; but with the average person the cure is permanent. Val has been treated twice already."

The dememorizing principle, I discovered, was that of an electro-hypnotism * exercised on the individual through the medium of the machine. Soon afterwards I saw one, a hideous *mechanical*, whose staring eye focussed a red ray on those of the patient. There was a musical device, too, and subtle vibrations which rocked the body into quiescence. But more of this anon.

It was from Editha I learned something of the cultural side of life in Arcadia. To a question of mine she replied, "Of course we have great writers and poets and actors. Would you like to have Meta read?"

"Meta?"

"Yes, the outstanding novelist of today."

I nodded.

"Very well, what reader do you prefer?"

"What is a reader?"

"Oh, I forgot. You don't understand, of course. But just as in your time songs might be sung or poems recited by different individuals, so we have our novels read. Some readers are better liked than others. A certain reader can do better with philosophy, say, than with fiction. People also have different tastes regarding them. A good reader can often make a success of a poor novel or poem."

"But don't you read for yourselves any more?"

"Very seldom. Only those of us who are scholars and who delve into that sort of thing. Reading and writing in your sense of the words have really gone out of fashion. A poet or writer, any creative artist, dictates to a recording machine, the recording plate is slowed up for the benefit of the reader, who learns from it each chapter by heart and then in turn reads it to another permanent record. This record is then placed in a disk in the broadcasting department library and can always be played for you on request, if no one else is listening to it. Just watch me, now."

CHAPTER VI

Some Entertainment

SHE manipulated various dials and devices inset in the wall. A metallic voice said: "LF, section ten."

"Meta, by Elinor," said Editha.

"That means," she explained in an aside, "that I am willing to listen to any of Meta's novels read by Elinor."

"Who was it that answered?" I asked, curiously.

"A *mechanical*," answered Editha. "All routine jobs like that are done by *mechanicals*."

A sweet, penetrating voice filled the room. The "reader" told us a romantic story—an old-fashioned romance, she termed it, yet I gathered that the scenes were set in the period immediately following the women's rise to power. Much was strange and practically unintelligible to me, yet that the story was what we call "well and powerfully written," could not be gainsaid. And the reading of it was superb. It was not only reading, but, in its way, inimitable acting, though the voice of the reader alone registered. Yet that voice could run all the gamut of emotions. Without losing a certain basic and enthralling feminine quality,

* By this device the memory cells of the brain were invaded by the electric current and "memory impressions" were blurred. Complete erasure was not possible without injuring the subject.

it nevertheless changed with the speaking of every character; and even with the delineation of character and the description of scenery, the voice subtly and magnetically varied; and in its varying timbre one could almost see the various persons, the scenes so graphically depicted. To such great heights had the Arcadians carried the art of reading.

An hour passed like a minute. Finally the voice ceased. After a while Editha asked: "Perhaps you'd like to see a play—by some ancient playwright of your day?"

She readjusted the dials, turned a crank, spoke rapidly, and a section of the wall slid up and revealed a stage quite in the old manner. It was but the counterpart of a stage, televisioned on a blank wall, as a projecting camera might show a moving picture; it was three-dimensional in character, with the settings and the costumes of the actors naturally colored. The play was Shakespeare's *King John*, and never had I seen the old tragedy acted better. The poignant scene where Hubert comes to burn out the little prince's eyes and Arthur pleads for his sight, the pathetic plea of the Lady Constance at the tent of King Philip of France, brought tears to my eyes. Finally the little prince died on the cruel stones, the lords entered and accused Hubert; King John denounced his henchman and protested his own innocence; the last scene faded. Editha rested in my arms and now and then stroked my cheek with her soft hand.

"It's only a play," she said.

"But a play founded on bitter truth," I replied.

I told her something of early English history; of the kings and the barons; of the cruel intrigues of both and their murderous rises and falls to and from power. She was surprised, having thought Shakespeare's plays imaginative works only. English history prior to 1900 A. D. was practically unknown. From such talk we drifted to a discussion of her own times.

"Those actors," I said after a while, "were all women. Even the readers you mention are feminine. Are there no men poets, actors, writers, or reciters?"

"Oh, yes," she said, "there are some very good ones, but not so many as there are women. The men are not talented generally."

I made no comment. "Even Shakespeare was a woman," she remarked.

"But he wasn't," I burst out, astonished.

"Oh, yes, we have an authentic bust of her in the Pantheon of Fame."

LATER saw this bust. It was that of a noble-looking woman done in marble. On its time-worn base, in faint letters, was undeniably chiseled the name "Shakespeare." Whom it really represented, and how it had come to be passed off as the head of the great English dramatist, must forever remain a mystery. But I could not help suspecting a conspiracy on the part of the women to steal celebrities of the past for their own sex when I discovered that Walt Whitman, Mark Twain, Carl Sandburg, Robinson Jeffers and others had also been labeled as women, though in most of these cases the busts had once been genuine enough, a skillful chisel having merely smoothed their features into a more feminine mold. However, such stealing and fraudulent misrepresentation had evidently been accomplished in the early days of Arcadia, centuries before Editha's time, and she had no suspicion of the truth. In fact, when I sought to enlighten her regarding the matter, she suspected me of lying for the purpose of glorifying the men, so I gave up; it was a hopeless job.

I learned that ordinary books and plays of some months' standing could always be seen or listened to in the home, but that special or recently turned out features were first given in theatres. One could always go there for a premier rendition, and those occasions were looked forward to as great social events.

In Arcadia, I discovered, great artists were not rewarded in a monetary fashion (in fact the Arcadians possessed no monetary system), but all over the community stood the statues of inventors, writers, actors and the like. The really famous personages were depicted everywhere and buildings were named in their honor. Crowds flocked to pay homage to them whenever they appeared in public. Thousands of admirers showered them with spontaneous gifts and applause. Only the most famous, however, could ever expect to have their statues and pictures in the Pantheon of Fame, in the company of the fabled geniuses of the past, or to be decorated with a garland of roses by the Mothers. Naturally, competition for those honors was very keen.

Men and women toiled long and weary hours, through tedious months and even years, to perfect a picture, an idea, a story, with which to win public acclaim. To be the idol of a whole country, lionized, looked up to—was not that enough incentive for one's ambition? I began to question whether our own idea that men must be spurred to the heights by money was not false at bottom. But to proceed with my story.

In spite of the status of men in Arcadia I was overwhelmingly happy. Yet even in my happiness I knew moments of doubt. Editha could be likened to a beautiful tigress chafing at the bonds of affection. Mixed with her passionate love for me was a subtle antagonism, even a hatred, that could express itself in sudden gusts of anger. She was like a truckling boy one has conquered, who nevertheless returns again and again to the attack. Often she would throw her arms around me in caress, hugging, kissing, and just as suddenly rush at me to subdue me physically. Save for the utilizing of the jiu-jitsu trick I was no match for her strength. So I did not always try to fight back. More often I allowed myself to go passive in her arms, to smile tolerantly in her scowling face. This form of tactics baffled her.

"Ha!" she'd taunt me, "you're like all the men—afraid to fight back!"

"Why should I," I countered easily. "Haven't I proved myself the better already? Besides, we men of the twentieth century don't fight with girls—they're too weak."

On Raising Children

"WEAK!" she would cry furiously. "Weak!" and whirl me up in her strong arms. But sometimes it was I who would take her by surprise, deliberately, cruelly, pressing on the paralyzing nerve and bending her back, back, under my ferocious glare, until her tensed body went limp.

I am prone to tell the story as if we lived in and by ourselves alone, but this was not so. All around us the swirling life of a great city went on. Editha took me to see the children. I had wondered where the young were. They were raised in great nurseries, boys and girls, without any attempt to separate the sexes. I had expected to see babies; but the absence of any children under five or six caused me to inquire where the infants were. Editha smiled, as did the women with her. "Oh, children are not delivered from the ecto-genetic incubators until their growth is well along. The Mothers used to bear them in their bodies nine months. But the machine is capable of bearing them much longer than that, years if necessary, so why not safeguard them against children's diseases and ailments, and all sorts of bad environmental influences by keeping them in the container until they are five or six?"

"You mean," I asked in amazement, "that those tots

aren't born until that age?"

"Yes."

"But isn't it awkward to handle them so big? To teach them to feed and talk and form other habits?"

"Why should it be? In fact they learn much more rapidly. However, there is a conditioning chamber where the new-born child is placed in special contrivances and taught its first social habits."

I meditated on such surprising information.

"But," I exclaimed, "you bring the young up in huge nurseries, without individual mothering. Now our scientists have proved that children do not thrive in an institution, away from the individual care and love of their parents."

Editha smiled tolerantly. "Well, in the first place," she answered, "your scientists were thinking of infants of nine months, just born, or those under two years of age. Again, if I am not mistaken, your statistics were compiled from the showing of institutions where the nurses who did the mothering were often doing it merely for a living and not from an interest in the children. Believe me, that makes a big difference; a pyschic difference. Besides, the institutions of your day were very crude and inadequate, and the statistics based on them consequently faulty. Now with us, even when children were born from the incubators at nine months, only women psychologically capable of mothering them and giving babies the genuine affection they must have were allowed the care of them. Besides being good for the children this provided an outlet for the maternal instinct of those women who still desired intimate contact with offspring. There were fewer of them," she said drily, "than you might imagine."

"Look at them," remarked another woman; "don't they seem absolutely healthy and happy?"

AND in very truth they did. The children romped about entirely naked. There were swimming pools and instructors, and a variety of devices strange to me. We went into the reading room. Here stories and poems of imaginative character were read to the children. In another department, history, science and philosophy could be heard. The themes of the stories and the lectures on the various subjects were often interestingly illustrated. Thus I saw early Arcadian history being read, while the incidents described were depicted on a three-dimensional screen. The two were synchronized (the reader and the picture) so that there was no break in the narrative nor hiatus in the action. So it was with all that was being taught the young. I found the schools absorbingly interesting.

"There is no attempt to talk down to children or to treat them as infants," said Editha. "Everything of interest to educated and cultured people is here read and illustrated for them. Attendance at any reading or lecture is not compulsory. They come and go at will. But as you see, the rooms are always crowded. The boys and girls are brought up in these schools until fifteen, when they are taken to training centers for three years, taught how to use air-shoes and other every-day devices, before being incorporated into the life of the community."

I met many women at these schools and nurseries, but never a man. The men either didn't take their duties so seriously as the women, or perhaps they were not encouraged to come, I never quite learned which. I tried to sound the women's ideas regarding the men. That their prevailing attitude towards them was one of tolerant affection I soon discovered, though this ran the whole gamut of emotions from complete indifference to open hostility. Editha herself was contemptuous of them as a sex. "They are—so weak," she said.

"Well," I countered, "can they help that?"

"Perhaps not."

"It's rather odd," I said, "that men should suddenly, in a few centuries, become one uniform height, and women another."

"Why odd?" she demanded.

"Well, it wasn't so in my day. You can't reasonably doubt that, because you perceive me. Then men were on an average larger than women, but many women were bigger than many men."

She looked at me with the scowl I had come to know meant the prelude to a fight.

"There is nothing to the story some discontented men try to spread. Males receive the same attention before and after birth as do females. Besides, if they don't like things as they are, why don't they vote themselves into power? They have the same rights at the ballot as the women."

"But not the same numbers," I murmured.

She leapt at me furiously, catching me, whirling me off my feet. "Oh, you men!" she cried. "You are all fools! Some day we will get rid of you entirely!"

A Minor War

DURING my stay in Arcadia there was one term I heard frequently used, the *Mothers*. At first I thought this applied to all women, but I soon learned otherwise. There was a hierarchy of females. The majestic woman who had interrogated me on my first entrance to Arcadia was a Mother. Not all women were allowed to be Mothers—only a selected few being privileged to bring offspring into the world. The Mothers were relatively few in number, and could not die. This latter statement astounded me. "You mean," I asked Editha, "that they are immortal?"

"Yes."

"But how, where . . ."

She shook her head. "I don't know. That is the wisdom of the Mothers."

I smiled at this, for I realized that here was another illusion fostered on the masses by the rulers.

I tried to learn more about this higher body of women, but seemingly there was little to learn. The Mothers lived to the southward. Few of them ever came among the ordinary people, except in moments of emergency, although by means of the various mechanical devices they were in constant communication with the central control stations. Motherhood had taken on a religious significance for the people of Arcadia, including most of the men. The Mothers constituted the priesthood of a religion in which women alone functioned. There were certain rites connected with this religion. That the men knew little of them I believed, because in my brief contact with the Committee of the League for Masculine Equality nothing had been said regarding rites. Of course that may have been because other matters were more pressing. Nor did the women vouchsafe me any information.

Once, however, Editha said: "The Mothers do not need to die. Only now and then does one wish to go on through the portals of death to other planes of manifestation. Then the remaining Mothers select a new Mother to take her place. But no Mother has gone on now for two hundred years."

She told me no more, and perhaps knew no more to tell.

It was at this time I had my first journey in an airship.

"The Yanas," said Editha, "of Dobruda (Central America), are threatening war. We have to send some airships to pacify them."

"War!" I exclaimed. "But I thought war was abolished?"

"Between the old established nations, it is. But you

must realize that a great many primitive peoples—as for example in sections of Africa—were just left free to develop along their own lines of culture and to live life as they pleased. No effort was made to coerce the weaker races into a manner of living that might be detrimental to their existence. However, when we had our upheavals in Arcadia, immediately after the last disastrous conflict of nations and during the period when women were coming into power, many men, and women too, who could not agree with the plans of the new régime, emigrated to the more primitive sections of native wilds and settled there. No effort was made to stop them for, in accordance with the new policy, minorities might do as they pleased in that respect. Unfortunately, however, the men and women choosing to go to Dobruda were very reactionary types, taking along with them certain of the old arts, the making of deadly weapons, gunpowder and explosives. They and their descendants, living the old life we have outgrown, evolved into warlike nations and are dreaming the old vicious dreams of conquest and empire. Several of them armaments, we are helpless. Also they know that, purpose of attacking us. They believe that having abolished armaments, we are helpless. Also they know that, pursuant to our systematic reduction of population, our available woman and man power is less than theirs."

"What is the population of Arcadia?" I asked curiously.

"Five million. Four on this coast and one along the Atlantic seaboard."

I exclaimed in astonishment. "Why, America is nearly depopulated! She must be half a wilderness!"

EDITHA looked amused. "Oh, no! In between those two strips of human beings are the *mechanical cities*, the vast centers of factories and manufacture. If we counted the machines our numbers would run to a hundred million. Of course we have allowed thousands of square miles to go back to a virgin state—territory where the natural wild life of the country has increased again in profusion—but nonetheless, Arcadia is by no means a wilderness."

I shook my head doubtfully. "What is the population of the combined central states?"

"About twenty-five millions."

"Good Lord! They outnumber you five to one."

Editha laughed at my consternation. "Well," she said, "we have finally decided that those warlike states must be subdued and brought to reason. First, we shall deprive them of their weapons and means of manufacturing them; then we shall install a *mechanical city*, take control of education and run the country until the intellect of its people is on a saner basis."

"But you have no weapons," I protested. "How can you combat them?"

Editha smiled. "It is true we have not developed deadly methods of wiping people out. The manufacturing of such destructive things is only preliminary to the desire to use them. Nevertheless, we have not left ourselves hopelessly open to attack. A proper offensive is a good defense, as you will see."

It turned out that Editha was given command of the expedition against the enemy. The airships, twelve in number, were huge cigar-shaped vehicles, automatically controlled by power stations running down through what used to be Mexico and Panama. Batteries stored energy for emergency uses. The ships could not fall, being supported by compressed air in the same manner as air-autos: only, when in flight, they attained a speed of five hundred miles an hour. The interior of those airships was divided into various compartments—a control room, living quarters, etc. As far as I could see they carried no weapons of any kind. Besides the inevitable mechanicals, the crew consisted of twelve women, four to each craft. That I was permitted to go along was probably due to Editha's influence, and doubtless to the fact that I was not exactly rated as other men. However that may be, go I did. It was a glorious night when we started. To my surprise, our departure apparently aroused little interest. We might as well have been going for a cruise across the Bay as on an expedition of such importance. The crews filed aboard. One by one the giant vessels rose, ours being the last to take to the air. Just before it pulled away a woman came aboard. It was a Mother, a majestic woman. She gave no orders, appeared to exercise no authority, yet that she was regarded with more than affection was plain to see.

Above the Enemy

OF that swift, almost noiseless flight through the night and well into the next day I can say little. It was possible to view the country beneath us from crystal-like windows set in the floor of the airship. These windows were really composed of several separate sheets of material resembling glass. A device operated by the turning of a screw focussed those windows much in the manner of telescopes, so that it was possible to bring the terrain passed over as near the vision as one desired. This gave the illusion of skimming the earth and the mountain tops, when the altitude recorder showed us to be a thousand feet above them at all times. Editha, however, sat in a chair in front of which was a desk and a mirror and viewed the surrounding world reflected in the latter.

Ten hours after setting out we were in the enemy's country. From our altitude of a thousand feet populous cities could be observed quite distinctly, the smoke and dust of factory centers. One large city seemed to run into another with but little break of continuity. White roads ran this way and that, lined with tropical palms. Large bodies of men could be seen trudging those roads. They were like infantry of our days. We later discovered that they wore uniforms of a field-grey, and the weapons they carried shone dully. What appeared to be motor auxiliaries rolled along, and lumbering over the rough country that bordered some of the roads came tanks. Yes, tanks! No mistaking them with their caterpillar treads and squat turrets. "Lord," I thought, "those people down there are just about where America was in 1914!" Suddenly I observed those soldiers glancing up. Mounted men rode back and forth, evidently giving orders. Field artillery swung into position. Our ship rose swiftly to three thousand feet. Anti-aircraft guns pointed blunt noses to heaven and belched smoke and flame into the air. Shells soared upward and burst. Then swarming into the air like a flock of vicious hawks and darting venomously for us, came the enemy airplanes. They resembled the German Fokker type, speedy and swift. On they came, spitting death through whirring propellers. How were we to meet them? Doubtless the pilots were supplied with bombs and hand grenades to drop on us if they should win elevation enough. The thought was not pleasant. I'll admit my heart leaped into my throat, and I was afraid.

But no one save myself appeared nervous. Most of the women sat around seemingly unconcerned. A concave device inset in a panel about four feet in front of Editha showed the interiors of the control-rooms of all twelve airships. Editha spoke steadily into a sensitized plate, giving orders. The Arcadian ships separated, spreading out over miles of territory. And as they spread, they rose. Our particular ship went up, up, soon leaving the airplanes of the enemy hopelessly below. Twenty thousand feet. . . . Now we hung, motionless, in the thin air. For

the first time Editha looked at me and smiled. I could not help thinking involuntarily how like a woman of our day I was being treated. The periscopic device on the wall showed the position of all ships, infinitesimally small. In the mirror on the desk the country far beneath was sharply etched; through the windows in the floor it appeared not more than two hundred feet beneath us. It was uncanny to observe airplanes apparently flying flush with the ground, to see shells exploding directly over the cannon's mouths. Crowds of men and machines were massed together into a black smear. Editha spoke quickly. What appeared to be a long cone projected from the rear end of the bottom of our craft. A *mechanical* came forward with a stand on which was set a keyboard looking not unlike a pipe-organ. There were five banks of keys, one above another in step formation, and above them was a double row of stops engraved with queer mathematical symbols.

"BAYERS," said Editha, "what you see before you is a *molecular annihilator*. It annihilates not men but metals and certain gases, by exaggerating the characteristic vibration of their molecules and thus disrupting them. That is putting it very simply and is not really an explanation of what happens. The reason of the phenomenon is not clearly explainable as yet, even to our foremost physicists. But that the action is what I describe—behold!" She pushed in a stopper, pressed down on a key. "A ray is now shooting earthward through the emitter projecting from the bottom of the ship. All iron within the range of the ray will disintegrate and fall to pieces. Look!" She pointed to the floor. Through the crystal windows I could see human figures running this way and that in wild confusion. Weapons were melting in the grasp of terrified soldiers. "Our other ships are also directing the ray," said Editha calmly. "We vibrate iron—five minutes. So! All the iron of the enemy arsenal and factories is being destroyed. It is gone. We press this stopper, this key—lead." So Editha spoke, pressing key after key and naming metal after metal. With awe-struck eyes I saw huge tanks disappear, motor-lorries sink into wrecks, cities become ruins.

"Nothing is left," she said at last, "but wood and stone. Their military equipment is dust, their explosives harmless air. Thirty minutes—and it is all over." She spoke quickly into a sensitized plate. The *mechanicals* ran back the keyboard, the cone withdrew into the bottom of the ship.

"Now to descend and dictate terms," said Editha blithely.

* * * *

(At this point in his story Professor Bayers paused. We stared at him fascinated. Until then he had spoken in precise, even tones, as if delivering a lecture. It was this fact that had held us silent. But when he resumed speaking, his face lost its earlier look of triumph. In fact that look had faded early in the narrative. Now it appeared haggard and wan. His voice quickened, the words were jerked out, so that towards the end it broke, became surcharged with emotion, filled with grief and horror. We listened, with what feelings you may imagine, as he went on, to the climax.)

CHAPTER VII

Afraid!

UNLIKE our departure from Arcadia, our homecoming seemed to be an occasion for the congregation of a vast number of people.

"They have gathered to welcome us home and to congratulate us on our victory," I said to Editha.

"No," she replied. "War with us is looked upon as the worst of evils. Not a citizen would think of mentioning or celebrating a necessary but loathsome task. Besides, the success of our expedition was taken for granted."

We stepped out of the airships, walking as usual on cushioned air. I could see that the majority of the crowd was composed of women, though men were present also. The great open building in which the machines had come to rest was occupied now by a device that had not been there the day we started. It was like a huge blackboard whose surface had an endless perspective of darkness. At sight of it the women composing the crews of the airships paused abruptly.

"*The Mothers!*" whispered Editha.

Then in the oppressive silence that seemed to have fallen on everyone, the majestic woman walked to the center of the cleared space in front of the huge device and spoke:

"Children," she said, "it is already known in Arcadia that a mother has chosen to go on. Mother Victoria, who for three hundred years has been the vehicle of life, laid down her body yesterday, and it has become necessary to choose a successor. This successor is one of the daughters who make up the crew of the expedition just returned from Dobruda. The Hierarchy of Mothers will now make known their choice."

She stepped back. As she did so the inky blackness of the blackboard device clarified like a great crystal, and in the crystal grew the lifelike counterfeit of perhaps twenty women. These women were standing. They were clothed in silvery draperies only half concealing the magnificent contours of their bodies. One of them held a wand, a queer thing with a serpent's head. This woman advanced towards the members of the crew among whom I stood. The effect was that of a person walking right out at you from the expanse of a moving-picture screen. Only the body did not increase in size. As she came, the women fell on their knees, hushed faces upturned. The serpent wand hovered above them. Then with a quick motion it seemed to flick out and rest for a pregnant moment over Editha's forehead.

"Editha! Mother Editha!" cried the crowd with one voice.

With a little cry Editha swayed to her feet. "No!" she cried, "no! I do not deserve . . . I am not worthy . . ."

She caught at me with trembling fingers. "Bayers," she said, "I am afraid, afraid."

My own heart was in my throat. What did it all mean? If they meant to separate us, I determined to show fight. Vague thoughts entered my mind of breaking away from the crowd, of attempting to flee with Editha to my time machine. Would to God I had followed the impulse! But no attempt was made to part us. We were both led through the acclaiming mob to where another, a smaller airship waited. The majestic woman ushered us aboard. "Fear nothing, sister," she said to Editha.

THIS ship was more modern in its equipment than the old-fashioned war-vessels. No crystal windows were inset in the floor, all view of the earth beneath being had by means of mirrors. The majestic woman took the controls. We were off. I saw by the compass that the course was nearly due south. The instrument for registering speed, which I had learned to decipher, showed we were setting the terrific pace of six hundred fifty miles an hour! To a question of mine, Editha replied dully, "We are going to Diraan."

"And where is that?"

"A few hundred miles down the coast. We passed to the east of it on our journey to Dobruda."

I learned that Diraan was the secret city, the temple city of the Mothers, where the ecto-genetic laboratories

were. Our first sight of it from the air was a marvelous one. Stretching up the foothills where Altadena had once been, and covering the slopes and top of Mount Echo, going to the very crest of Mount Lowe itself, lay the city of the Mothers. I gazed at it with wonder and admiration not unmixed with awe. The magnificent, ethereal buildings seemed to change, to take all shapes and hues from minute to minute. Vast stretches of parklike gardens lay between the various buildings, and in the reflecting mirrors one could see the hordes of *mechanicals* going about their tasks with mechanical precision. But over this city no air-autos rolled, no people walked. Of its human inhabitants we saw nothing. Our craft finally alighted, not in but beyond the city, towards where San Marino, the city of millionaires, once stood. But now this section of country was a wilderness of fruit orchards and gardens. Here the majestic woman left us with no word of explanation, only smiling at Editha and murmuring, "Love and be happy, fear nothing!" We watched the air-vessel that had brought us leap into space, circle above us once, and then disappear to the northward.

As the afternoon was still young, we wandered hand in hand through tangles of orchards and gardens. Oranges, peaches and pears were ripening on the bough. We plucked golden delicious fruit and slaked our hunger and thirst. *Mechanicals* glided about, intent on nothing but their directed labors. Most of them had a grotesquely human aspect, though some looked not unlike birds or reptiles. By and by we came to a gleaming rose-white lodge. Here all conveniences for living were gathered. Editha appeared to have lost her former fear and mistrust. She sang and danced on cushioned feet. I laughed and sang with her. Her good spirits were contagious. Yet in my heart I was not at ease. For what purpose had we been brought to this sylvan paradise? Clearly not for the mere purpose of living and loving. Something more serious must lurk behind, or rather beyond, this glorious interlude.

Three weeks passed in this way—weeks in which we saw no one save the *mechanicals*, weeks of happiness surpassing anything I ever expect to know again. Once I asked Editha if she knew anything of the functions of the Mothers. She said yes, that they bore the children I had seen in the nurseries and schools; that they had borne all the population of Arcadia.

The Ceremonial

"YOU mean," I said, "that the ordinary women can't bear children?"

"Of course not! Didn't you know that? They can love and be happy, but only the Mothers are the vehicles of life. It is they who devote their lives to tending the machinery that brings the embryos to birth, who regulate the increase of population."

"In favor of their own sex," I added.

"That isn't true." Editha's eyes blazed. Then she looked at me uncertainly. "Those men told you lies. I don't believe a word of what they say." But I saw she was troubled, so I hastened to change the subject.

"But there must be fathers!"

"Of course—fathers. Each Mother when she is chosen is allowed to bring her chosen lover to the secret city. I know that."

"Well, what are their duties?"

"I don't know. I suppose they live with their mates—as you, my virsekso, are living with me."

We both laughed. Suddenly a great wave of relief rolled over me. Why, of course, there was nothing to fear! Men might not be considered the equal of women in Arcadia, or in this secret city, but nonetheless I was Editha's husband, and her chosen mate.

be separated. So I thought, reveling in my fool's relief. And then the blow fell.

As usual we fell asleep at dusk, after listening to a book read by Elinor, tired out from a day of continuous activity. I awoke—to find the morning sun shining through the opaque walls of a strange room! Fear leapt in my heart. "Editha!" I cried wildly; but Editha was gone!

I flung myself like a mad man at the doors of the room, at the walls, but they were impervious to my blows and kicks. The morning hours passed. I could measure them by the slow movement of the sun's rays. When the sun stood overhead the doors noiselessly opened. Two *mechanicals* entered and in spite of my resistance made me a prisoner. I was borne, helpless, in an iron grasp, to an audience hall. How can I describe it? The hall was arranged like an amphitheatre, in circular formation, tier on tier of seats rising towards a remote ceiling. On these seats sat a concourse of females, by their dress, Mothers. But it was not on this concourse my eyes rested with fear and awe.

In the center of the hall, on a large dais, stood the women I had seen in the crystal. In their filmy garments, with the contours of their heroic bodies gleaming darkly through the silvery draperies, they presented an overpowering, an unforgettable, sight. In front of them, on the floor to one side of the dais, the *mechanicals* stood, and I could neither speak nor move. Only fearful thoughts ran through my brain and all my old fears were revived a thousand-fold. Where, in the name of God, was Editha? Then I saw her coming. She was still clad in her one-piece garment. Only her face was pale and still, and her eyes had the unrecognising stare of one who walks in her sleep.

"Editha!" I tried to scream, but the name strangled in my throat. At her coming the concourse of women stood up and with one voice cried: "Welcome, Editha!" Then they sank into their seats and the woman with the serpent rod advanced the length of the dais until she stood in front of Editha. I knew I was witnessing some ceremony of initiation.

"A mother has gone on," intoned the sweet, penetrating voice of the woman, "and a Mother arrives. Editha, are you willing to become a Mother?"

WHEN I saw the color steal back into Editha's face, her eyes begin to glow with a look of intelligence and understanding. But she only said with a strong, vibrant voice, "I am."

"Unless it be her will to pass on and seek spiritual perfection in other spheres, she shall live forever. Body after body shall she wear and her youth shall not pass away."

"She shall live forever!" intoned the concourse of women.

"Editha," said the sweet, penetrating voice, "your body is fair and acceptable in our eyes. Do you dedicate it to the perpetuation of life?"

"I do," said Editha.

"Then with these garments do we cover you, and with these symbols seal you to the Hierarchy of Mothers."

Editha was clothed with flowing garments, a finger of her hand was encircled with a ring and a string of jewels strung around her neck. She knelt at the feet of the woman with the serpent rod. The woman raised her up and kissed her on the brow. The concourse of Mothers broke into a low chanting. I had watched these various things with what emotions can be imagined. Suddenly came power to move my limbs. With a swift rush forward I clambered on the dais and threw myself in front of Editha, both of my arms encircling her body.

"Dearest!" I cried. "Dearest!"

But she looked at me unseeingly. Her eyes bore a strange remote glow, and her face was rapt in some exalted ecstasy.

I shook her with my whole strength. She gazed at me without recognition.

"Who is this?" she asked evenly.

"Editha!" I cried, "it is I, Bayers! O my God, what have they done to you!"

But now the *mechanicals* came forward and again made me a prisoner. Without deigning a farewell look, Editha passed out of the audience hall with the concourse of [redacted]

"You!" I cried wildly, glaring at the Mothers still left standing on the dais. "What have you done to her with your infernal arts? You have hypnotized her, robbed her of her memory!"

"Hush!" said the woman with the serpent rod so forbiddingly that I fell into silence. Then she said slowly: "It is not permitted that a man shall possess in love and passion a woman vowed to life, to Motherhood. Three weeks you have had in the garden, and the seed of your love shall in due time blossom. Now your season of love is over, and your body shall go from here to dwell in the House of Husbands."

"The House of Husbands!" I echoed.

"Yes," she said, "where you shall be indexed . . ."

"Good God!" I cried, "what are you going to do to me?"

"Oh, it will be painless and not dangerous. Be assured, you shall not suffer. Your body shall be kept alive and through Editha father many children. I have spoken. Take him away."

How shall I describe what followed! It is like an evil dream, a nightmare. That I was under mesmeric control of a machine, I believe. But once I knew that Editha was looking down on me, and her eyes were cold and stern. Vaguely I was conscious of strange instruments, and what seemed a gigantic X-ray. Then a blank. . . .

I came to myself in a long, bare room open on three sides to an expanse of park. I was alone. I sat up wildly, strong enough in my limbs, yet aware of a vague sensation, a feeling, an emotion. . . . I looked at my body and horror gripped me. I raved, I swore. But I was alone.

All around me was the empty park. Perhaps the Mothers forgot I was not as other men. Doubtless the males of Arcadia would have been cowed by the females and resigned to their fate. But in my brain I was conscious of only one blind impulse: to rise and flee from the horrible place. Oh, I was in the grip of a nightmare! I would outrace it—I would! Where I found the air-shoes and the rod I do not know. With their aid I walked and walked, and somewhere or other possessed myself of an air-auto. Perhaps I didn't. Perhaps I imagined I did. Be that as it may, I came, somehow, someway, uncaught, undetected, to where my time machine lay concealed in the hills. I had but one desire, to get aboard it, to return to my own people, to 1950. I did. I am here! . . . .

Professor Bayers ceased speaking abruptly. We stared at him unbelievingly. At last Ellis spoke.

"Do you really expect us to believe—this incredible story?"

Bayers only looked at him. We could see he was not joking. There could be only one explanation. The man was mad, mad. Even as the thought came to me, Ellis went on, "What proof have you . . . proof. . . ."

"Proof!" Bayers ripped the coat and shirt from his shoulders. "Proof!" he cried wildly, "proof! Look at me—look!"

Then indeed we came to our feet with a surge, staring at him in horrified amazement, scarce able to credit the evidence of our own eyes; for there emblazoned on his chest, six inches high, and by a curious process that seemed to have bitten into the very flesh, were the letters:

[redacted]
(Editha)

THE END.

$100.00 in GOLD for a SLOGAN for

Science WONDER Stories

A few moments of your spare time NOW may bring you $100.00 in gold.

WE want a catchy slogan for this magazine. Slogans are now used universally in many different lines of business; we believe that this magazine should be known by its own slogan.

Such slogans as "Not a Cough in a Carload"; "Good to the Last Drop"; "Say it with Flowers"; etc., are well known. A number of magazines have already adopted slogans; such, for instance, as *Popular Mechanics*, with "Written So You Can Understand it."

REMEMBER, THERE IS NOTHING TO BUY OR SELL!

You have an equal chance to win this prize, *regardless of whether or not you are a subscriber.* The contest is open to all. Get your friends in on this and, if they give you suggestions, you may split the prize with them, if you so desire.

To win the $100.00 prize, you must submit a single slogan, *one only.* It must be an original idea. It makes no difference who you are or where you live, whether in this country or not, anyone may compete in this contest and you may be the winner.

Look this magazine over carefully and try to find out what it stands for, what its ideals are, and what it tries to accomplish. Then try to put all of your findings into a slogan which must not, under any circumstances, have more than seven words.

After you have the idea, try to improve upon it by shortening the slogan and making it sound more euphonious; but always remember that it is the idea which counts. The cleverer the slogan, and the better it expresses the ideas for which this magazine stands, the more likely are you to win the prize.

No great amount of time need be spent in the preparation of slogans. Start thinking right now and jot down your thoughts. Also, tell your friends about it, and get them to submit slogans of their own; or compose one in partnership with them.

Here are a couple of sample slogans; which are given as mere suggestions, and not to be used as entries:

"THE MAGAZINE OF SCIENCE FICTION"
"SCIENCE TAUGHT THROUGH FICTION"

RULES FOR THE CONTEST

(1) The slogan contest is open to everyone except members of the organization of SCIENCE WONDER STORIES and their families.
(2) Each contestant may send in only one slogan; no more.
(3) Slogans must be written legibly or typed on the special coupon published on page 1050 of this magazine. (If you do not wish to cut the magazine, copy the coupon on a sheet of paper exactly the same size as the coupon). Use only ink or typewriter; pencilled matter will not be considered.
(4) Each slogan must be accompanied by a letter stating, in 200 words, or less, your reasons for selecting this slogan.
(5) In case of duplication of a slogan, the judges will award the prize to the writer of the best letter, the one which, in their opinion, gives the most logical reasons for the slogan.

This contest closes on May 1, 1930 at which time all entries must be in this office; and the name of the winner will be announced in the July, 1930, issue of SCIENCE WONDER STORIES, on publication of which the prize will be paid.

Because of the large number of entries which may be expected, the publishers cannot enter into correspondence regard this contest.

Address all communications to:

Editor, Slogan Contest,
Care of SCIENCE [redacted] STORIES
96-98 Park Place, New York, N. Y.

The Falling Planetoid

(*Continued from page 981*)

be no question of private profit in such a matter. If necessary, material and equipment would be commandeered, and capital and labor conscripted. That was definite.

Victory

CHAPTER IV

TWO years after active operations had begun, quantity production of the giant guns was under way. A full-sized model had long since been tested and found satisfactory in every way; the flight of the experimental projectiles and the results of their tremendous explosions as they landed on their distant object were closely observed by powerful telescopes. Now thousands of the mighty engines were complete and in place in a girdle around the planet, with more to follow. Mountainous quantities of the projectiles were ready, and unlimited quantities under construction. A visitor from some other planet chancing upon the earth would have thought we were preparing for some titanic war with another world.

The planetoid was perceptibly nearer. In one more year, according to careful calculations, it would approach the over-balancing danger line, when it would start inevitably on its final fall; then nothing within the power of mortal man could stop it. It shone brilliantly in the nightly sky, and was a beautiful object to behold. Its apparent diameter was about one-eighth that of the moon, and it was so bright it could be seen in the early evening. It acted indeed like a miniature moon in the sky, circling the earth every nine and a half days.

The final preparations were completed none too soon. Beginning on the morrow at midnight, the firing would commence. Each cannon was pointed to a predetermined dot in the sky, calculated with the utmost astronomical precision; and its enormous projectile, discharged at the correct split-second, timed to a hair, would go speeding toward its distant goal.

Promptly at midnight the terrific cannonading began. As the earth rotated on its axis, the discharges followed one another in perfect synchronism and in a continuous succession around the globe. The great gunlike engines were placed away from congested centers of population to avoid possible accidents and to minimize the enormous shocks of their discharges. The detonations were of such shattering power that the operating crews worked at great distances from the guns, setting off the discharges by electrical contact. Fifty thousand of these mighty propelling engines were finally in action, each firing at frequent intervals during certain hours; and the whole world followed the results with bated breath. At night countless watchers with glasses of every description crowded housetops, hills and every available elevation, and saw the exploding projectiles as they hit their objective. Many of the shells, of course, missed their mark and went traveling on into the immensities of space.

For over two years the constant bombardment of the distant celestial object went on without a let-up. Costs ran into even higher figures than the most careful estimates had foreseen. Into the devouring mouths of these cannon-engines went the results of billions upon billions of dollars worth of material and labor. The costs of the vast quantities of the rocket-like projectiles and their propelling charges, the huge cost of replacements, the immense explosions and the extreme accuracy required of these—together with the armies of people required in manning the engines, as well as transportation and other costs, were staggering. All of the earth's industries were geared to this one purpose, and every other activity, except those that were absolutely necessary, was abandoned.

The first few months showed no appreciable results. Millions of plunging hits and their immense bursting charges had bitten into the surface of the planetoid and caused it to be surrounded in a halo of dust and fragments. No doubt a good deal of its surface had been blasted away into the fastnesses of space never to return. Still, for a long time it was impossible to detect any change in its velocity and orbit, or in the size of the body. The people began to lose hope. There was even talk of giving up the costly project as futile, and becoming resigned to the inevitable.

But those in control knew they must continue; they had not lost faith in ultimate success. The steady cannonading went on, with increased numbers of engines in action day and night, without a let-up; through the weeks and the long months every cannon belched forth its spite against the threatening body; east and west, north and south, in every land, the rotating earth let loose its plunging projectiles. For like a dreadful nemesis which dogged our globe day and night, the dangerous planetoid had to be subdued, made captive and then blasted to pieces. And there was no power on earth to do it except the will and intelligence of man in using his limited control over matter and energy.

From every telescope available willing eyes, keen and intelligent, watched the results. And at last one day it came. From scores of observatories came the thrillingly joyful announcement that the crisis had been reached and passed! At last the cumulative effect of the millions upon millions of fifty-ton projectiles plunging against the planetoid with a velocity of many miles a second, and the still vaster force of their terrific explosions after they landed, began to respond to the immense artificial forces let loose resultant force of the aggregated blows, the giant planetoid began to respond to the immense artificial forces let loose against it; gradually, but at an ever increasing rate, it was overcoming its tendency to fall toward the earth's center. Finally, after two long years and two months, its speed was increased to 0.85 of a mile per second, and its orbit changed into a harmless ellipse. Henceforth the planetoid would continue throughout the ages as a true satellite of the earth and not as a destructive agent. Man lost his fear of the menace and the bombardment ceased. . . .

Ten years have passed and now the world breathes easily, disc shining in the sky; a beautiful member of our Earth-common crisis by a united mankind has been not without Moon system. It moves peacefully in its steady course, at a high inclination within the moon's orbit, but under the complete control of our good old Mother Earth.

And the great cooperation of the nations of the world had taught a much-wanted lesson. The meeting of a common crisis by a united mankind has been met without its stimulation on the general life. The world is stronger and the vast cost of the now happily-past danger has been more than made up and forgotten.

THE END.

Science News of the Month

ASTRONOMY—METEOROLOGY

[illegible] CYCLE OF CHANGE FOR UNIVERSE

Haviland H. Platt, Philadelphia scientist, has suggested the existence of what may be called the cycle of the universe. Modern astronomers and atomic physicists agree that all bright stars, like the sun, are pouring away their energy in enormous floods into space in the form of starlight and heat. None of this energy seems to return to the original bodies. After millions, or perhaps billions of years, the energy which now keeps stars and suns alight will be dissipated. The universe will then consist of cold, dead worlds following their orbits in eternal darkness at absolute zero.

Mr. Platt, using the observations of Professor Charles Brush, who is said to have discovered a silicon which will resist gravity to some extent, has suggested an invisible, universal ray, absorbed in small quantities by the matter of suns and stars, and providing their energy, much as sunlight warms a human body. This energy, together with atoms and electrons, is poured out by the suns. Throughout space these atoms may be transformed into ordinary matter plus the new universal ray. The ordinary matter may then collect into stars, begin absorbing the universal ray, and start the cycle of the universe all over again.

FIRST CARBON IN SUN

Moving-picture producers, seeking a way of photographing night scenes in the daytime, in order to avoid the use of powerful and expensive lights required for night photography out of doors, have developed new plates for using the infra-red light of the sun. Photographs made with infra-red light give a black sky.

With the new plates, it is possible for us to extend our study of light far into the invisible infra-red part of the spectrum. All our knowledge of the atoms in the sun comes from a study of the dark lines in its spectrum photographs. Pictures have been made of the solar spectrum by light waves nearly half as long again as the longest visible red light. One of the first results of the new infra-red method was the definite proof of the presence of carbon in the sun. Previously only a few weak lines of this element could be photographed, but with the new plates one of the principal groups of the lines of carbon have been recorded. These are in the same position in the spectrum as carbon lines from a terrestrial source, and show that the sun, like our own earth, contains carbon.

SUNSET ON MOON FILMED WITH LARGEST TELESCOPE

Motion pictures showing sunset on the moon, over an area about the size of the state of New Jersey, are one of the features of the annual exhibit of the Carnegie Institution of Washington. The film was made at the Mt. Wilson Observatory, in California, with a motion picture camera attached to the great 100-inch reflecting telescope, largest in the world. Like the earth, the moon rotates, thus causing the sun to rise upon it, cross the sky and set; but as the moon takes 27 1-3 days, instead of 24 hours, lunar sunrise and sunset are more leisurely than the earthly variety. Because there is no atmosphere on the moon, there is no twilight; and the sunset represents a sharp change from brilliant sunlight to darkness, instead of the gradual diminution of light on the earth. The film shows the shadows of the lunar mountains crawling across the surface. The actual time occupied in the taking of the film was 5½ hours, but it is expanded up in projection, and runs through in a moment and a half.

BELIEVE JUPITER IS REPEATING WEATHER

That weather cycles on the planet Jupiter resemble the cycles which are believed to occur from decade to decade on the earth, is suggested by reports from the famous observer of Jupiter, the Rev. T. E. R. Phillips, of England. Some months ago a string of dark spots was first noticed, forming a belt like appearance on the planet at the south edge of the zone corresponding to the North Temperate Zone on earth. These spots move rapidly with the planet's rotation, faster than the more permanent markings on the northern and southern edges of the new spotted belt.

A similar line of dark spots appeared at about the same place on the visible surface of Jupiter just fifty years ago, in 1880, remained for some months, and vanished. Experts believe that we do not see the real surface of Jupiter, but only the higher level of the planet's atmosphere, which consists of layers and belts of variously-tinted clouds. The repetition of the belt of dark spots suggests, therefore, that something in the planet's weather, causing a special kind of disturbance in the upper cloud layer, is now repeating itself after fifty years. It may or may not be a mere coincidence that this period is almost exactly one-half of the recurring 99-year cycle which some believe exists in earthly weather conditions.

AVIATION

R-100 CLAIMS AIRSHIP SPEED RECORD

The British *dirigible R 100* has claimed the world's speed record for airships, on the ground that it achieved a speed of 81.5 miles per hour on a twelve-hour test flight in a fog. The best recorded speed of the *Graf Zeppelin* is said to be 68 miles per hour. According to the head of the company which built the British ship, the huge craft attained a speed of 115 miles above the maximum specified in the contract. This brings England within sight of a cruising speed of 90 miles per hour, which is considered essential for successful commercial operation. It is to be noted that the new speed record was attained even though fully 600 H.P. was kept in reserve; and with this added propulsion, a speed of over 90 miles seems quite possible at the present time.

PLANS 15-HOUR FLIGHT TO PARIS

Colonel Harold R. Hartney, commanding officer of the First Pursuit Group during the World War, has worked out all details for a 15-hour flight to Paris, according to Sherman B. Aldish, writing in the *New York World*. Colonel Hartney intends to take advantage of the continuous westerly winds that prevail at high altitudes; and with the aid of these, and a high-speed plane, he hopes to attain an uninterrupted speed of 150 miles an hour.

The plane call for the use of a powerful supercharged engine in a plane that will attain a speed of 300 miles an hour at an altitude of 20,000 feet. The wind at an altitude of four miles will give an additional speed of fifty miles an hour. The plane would be the ordinary high-speed monoplane equipped with the engine mentioned, with oxygen tanks and with instruments for transoceanic navigation. In addition, the cabin of the plane will require heating, and insulation against the cold of high altitudes. The plane must be equipped with a propeller which will be efficient at five miles, and the plane will of necessity have to be refueled in the higher regions, because it will be unable to leave the ground with a load of fuel.

DIESEL ENGINES FOR PLANES

The Packard Motor Company, says *Scientific American*, has tested successfully in flight a Diesel engine, seven cylinder air-cooled, developing over 200 horsepower and weighing only a trifle over three pounds per horsepower. By the use of this engine the ignition and carburetion system can be eliminated, and heavy fuels can be used that are non-inflammable in char[illegible] The value of this, considering the terror of the burning plane, is very evident. The use of the Diesel engine is possible, says the article, only after many changes. The ordinary Diesel engine is low speed, and coupled with the low mean effective pressure developed, it is unsuitable for airplane service. A high speed engine therefore has been developed. No spark or hot bulb is needed for combustion of the fuel, for the high pressure and temperature alone will do this. That the fire hazard is much lower with the Diesel is explained by the fact that the fire point of gasoline is far below zero Fahrenheit. In the Packard test lasting over a year, in the cases where the fuel lines leaked or were broken, not a single fire occurred.

[illegible] HOPE AND HOPE NOT CAUSE FIRES

A belief among aviators, that if the ignition switch is opened before crashing the dreaded fire will be averted, is grounded on fact, says Bradley Jones in *U. S. Air Services*. This does not mean, however, that the fire is caused by the exploding of gases by the electric spark caused by the ignition. A test to determine the cause of fires in crashes was made. Old airplanes were slid down a long runway and into a brick wall. Slow motion moving pictures were taken in the ensuing crash. By removing the batteries from the planes it was found that just as many fires took place as with batteries in place. What Jones concludes is that the gasoline tank, being ruptured, throws the gasoline against the hot pipes, which set it afire. Thus the ignition is not responsible. But, he says, if the ignition is switched off before a crash the pipes will cool and no fire should occur when the gasoline is thrown against them.

BIOLOGY—EVOLUTION

OSBORN PRESENTS NEW THEORY OF EVOLUTION

Dr. Henry Fairfield Osborn, eminent anthropologist, has developed a theory of evolution which contradicts the theory of Darwin in some of its fundamental respects. Dr. Osborn has done away with the "ape-man" theory, or the "missing-link" idea, and instead has stated that, while man and apes developed from the primates of the Eocene period (about forty million years ago) there was no common ape-like ancestor. This is evidenced, for one thing, by the fact that the evolution of the human hand shows no ape-like characteristics in its development.

The paths of man and ape diverged in Eocene times, according to Dr. Osborn, and the roots of man's family tree are pushed deeper into the layers of geology and time. Another important point in which the modern scientist differs from Darwin is that he gives the age of man as about forty million years, whereas Darwin allowed only about a million years from the first man to the modern human being. Dr. Osborn makes the "Piltdown" man of Tertiary times the ancestor of present man, and this "dawn man" lived considerably more than 1,250,000 years ago. The discovery of the history of this dawn man, according to the great scientist, is "the goal and peak of biological discovery in the twentieth century."

HAD CRANIUM LIKE ANTHROPOID APE

The cranium of an English murderer, Frederick Deeming, who was executed in 1892, has been disinterred, and eminent anthropologists have stated that it is an exact replica of the skull of the Java Ape-man. This is another important link in the substantiation of the theory of evolution.

The skull is typical of prehistoric man of the most primitive type known to science. It presents striking resemblances to the skull of the anthropoid ape, notably in the opening at the base, which in the modern skull is situated at the center of the base, but which in the case of the murderer was located farther back, as in the ape. A cast of the skull of *Pithecanthropus erectus* fits Deeming's skull exactly, and there is the same heavy bony structure of brow and the same low cubic contents of the brain pan. The man, therefore, was little more than a dangerous animal, incapable of absorbing and retaining moral precepts.

BELIEVES SCIENCE WILL PRODUCE LIFE

Dr. Paul R. Heyl, physicist in charge of the Sound Laboratory of the United States Bureau of Standards, has stated that science is moving toward a clear understanding of the physical nature of life and, therefore, life may some day be produced synthetically in the laboratory. Life is physical and chemical in its nature, according to the scientist, and we will some day understand the processes that make life as we understand the burning of coal. Some day we may learn to produce protoplasm, which is the basis of life. Protoplasm is nothing but a chemical compound. We have, during the past few years, discovered some of the essential processes of the body. Most important of these was the discovery of the respiration ferment, which is essential in the process of transferring oxygen to the tissues of the body, from the hemoglobin in the blood, which has taken it in from the air in the lungs. Without this ferment the blood would not surrender its oxygen supply to the tissues.

GENIUS BRED, NOT INSTILLED

Professor Ernst Kretschmer, of Germany, has, through the study of hundreds of cases of genius and great talent, arrived at the conclusion that genius is bred, and not instilled into the individual by environment. The study of the records of 1000 school children supports the theory that the most talented individuals were descended from ancestors who were themselves out of the ordinary. For example, Goethe's parents were of dissimilar temperament, but both were highly endowed. Had they not been different, the writer might have been a passable journalist, but never a great genius. In the same manner, Bismarck was a great statesman because he came from a long line of ancestors devoted to statecraft. There is, however, such a thing as "clear-head talent"—which results in specialization in one field; but genius is the result of the crossing of "dissimilar high mental traits." This crossing brings about a complicated psychological structure in which the two components of the germ-plasm remain at a decided tension throughout life.

RACIAL SUPERIORITY DUE TO CHANCE

Races of men which build cities and make great contributions to progress are superior to races of men which live in savagery, not so much because the superior races have more innate ability, but because chance has favored them. This view was advanced by Dr. Fay-Cooper Cole, anthropologist, of the National Research Council. To prove that "favorable circumstances and ethnic accidents" play the chief rôle in the rise of human groups, Dr. Cole cited the Indian tribes of America, some of which advanced far toward civilization, whereas others remained static. In Europe and the Near East, the leadership of civilization shifted from the valleys of the Euphrates and the Nile to Crete, to Greece, to Rome, and finally to central and northern Europe. When Egypt was civilized, Rome was crude and barbarous. When Rome got its chance and rose in power and splendor, the northern Europeans were still semi-savages. But, once they became civilized, those retarded peoples became leaders of the world. Accepting the theory that all races of men might trace ancestry back to a common ancestor, Dr. Cole expressed the opinion that the present differences in races are chiefly the result of mutations, isolation, and inbreeding.

CHEMISTRY

GAS ATTACKS ON CITIES DECLARED IMPRACTICABLE

Though the possibilities of gas warfare in the future are practically limitless, Gen. Harry L. Gilchrist, chief of the Army Chemical Warfare Service, does not believe that the civilized world would tolerate gas attacks upon cities, nor does he believe that such hostilities would be practicable. It would take 50 tons of phosgene per square mile, for example, he states in testimony presented to Congress, to gas the city of Paris. This great concentration is required because air currents caused by buildings and cross streets would dissipate the gas rather rapidly. Inhabitants could be trained how to act in the event of a gas attack; to go indoors, stop up doors and windows, shut off ventilators and fires, and thus be safe. In tall buildings the upper stories would not be affected. New York's population, for example, could go up in their skyscrapers.

PROMISES LITHIUM AT LOW PRICE

Lithium, a metal almost as rare as radium, and so light that it will float on oil, has been produced in a way which makes its large-scale commercial production a possibility. Professor H. M. Partridge, of New York University, has discovered a method for producing the element at $15 per pound, wholesale.

The rare metal, lithium, weighs one-fifteenth as much as iron. Great commercial possibilities lie in its use as an alloy. One of its characteristics is the loss of its softness when it is combined with other metals. By its sponge-like absorption of gaseous impurities, it increases the lifting power of helium gas 15 per cent. It gives bells a sweeter tone. It will unite with nitrogen at ordinary temperature, and make possible the direct synthesis of ammonia. In the present method of making fertilizer from the nitrogen in the air, the chemical reaction takes place in an electric arc at a temperature of several thousand degrees.

DIAMONDS COVER ALL BURNT TOAST

Dr. R. E. Free, writing in *The New York World*, has described the discovery of diamond dust in burnt toast, in the deposit made by a smoky gas flame on the bottom of a kettle, in burning moth balls, carbonized sugar, and wood turned into charcoal. The actual discoveries have been made by Dr. S. Paramasivian, of Calcutta, India.

"Science News of the Month"

portrays in plain yet concise language every important scientific advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 42 scientific journals as well as a score of other sources are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, etc.

The minute crystals deposited on burnt toast are genuine diamonds and, if they were large enough, they would be as fine as any of the gems worn as jewelry. The point is, that while the diamonds on burnt toast are too small to be seen even with an ordinary microscope, they are perfect; for their atomic arrangement is without flaw, and precisely the same as in the larger diamonds.

ICE JAMS DESTROYED BY CHEMICALS

Chemicals are replacing explosives as a means of destroying ice jams in rivers and other waterways used as arteries of transportation. These jams cause great economic losses; when the St. Lawrence River freezes, and ships cannot reach Montreal, the losses are about $15,000,000 a week. The ice engineer specializes in preventing such losses. He uses a number of chemicals, chief among them being calcium chloride, which has been very effective in relieving ice pressure when destruction of a jam was not necessary. A truck of the chemical laid along the line of a wall gives adequate protection; wherever it touches the ice, the ice melts. Other chemicals used are calcium carbide, crude sulphuric acid, and hydrochloric acid. The most effective reagent is thermite, which is used also in welding.

CHEMICAL MEANS USED TO REMOVE VITAL ORGAN

A method of removing a diseased uterus by chemical rather than surgical means was described by Dr. Charles H. Mayo of Rochester, Minn. The technical term for the operation is "chemical hysterectomy." The procedure is particularly valuable in cases when the usual surgical methods of hysterectomy would be too dangerous to undertake because of the presence of serious disease in the heart or kidneys as well as in the organ to be removed. In the method followed by Dr. Mayo, zinc chloride is the chemical used. A few other surgeons have also tried chemical means. Dr. Mayo has followed the procedure in twenty-six cases in which it was unsafe to operate by one of the usual procedures. He believes that, in its limited field, the method is of value. Carefully done, it has been safe. The patient, unless she is in bad general condition, can be out of bed in five or six days, he said.

(Continued on Page 1043)

Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific discoveries and on established scientific facts. As space is limited we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also to print answers as soon as we receive questions. However, questions of general interest will receive careful attention. If you desire individual answers to your queries, enclose 25c in postage to cover time and mailing.

The Darkness of Space

Editor, Science Questions and Answers:

I wish to ask a question that has puzzled me for some time. All of your writers speak of space as being dark. But how can that be? Space is always open to our own or some other sun. There is no alternation of night and day, as there is on the planets. There is no turning away from a sun, since space does not rotate on any axis. How, then, can it be dark?

Herman Litwin,
206 East 53rd Street,
Brooklyn, New York, N. Y.

(In the first place, our phenomenon of daylight arises from one source—the atmosphere. Light from the sun strikes our atmosphere, is diffused through it, and the light is reflected to us. Therefore, during the day the heavens appear bright. Now, if there were no atmosphere, sunlight would strike our earth directly and be reflected or absorbed—but the heavens would always appear dark except where there is a star [which is a self-luminous body like our own sun] or a body such as our moon, which reflects sunlight to us.

The reason why space is dark is that it contains nothing to be illuminated. "Indirect" light is seen only because it is reflected by something.—Editor.)

The Coolidge Tube as a Weapon

Editor, Science Questions and Answers:

1. Can the Coolidge Tube really be used as a weapon—as fiction authors picture it?

2. If all the world's most powerful telescopes were placed end to end, would their combined power be greater or just the same as that of one telescope?

Ed Morris,
3914 West Monroe Street,
Chicago, Ill.

(1. The Coolidge Tube [cathode-ray tube] gives off rays which are harmful at close range. The penetrating power of a ray is determined by its wavelength, and those with the shortest wavelengths are the most powerful. The Cosmic Rays have the shortest wavelengths known. The Cosmic Rays are powerful enough to shoot billions of miles across space and still retain energy enough to penetrate six feet of solid lead. Professor Coolidge, by using a current of very high voltage—about 900,000 volts—has managed to create rays with a shorter wavelength than the X-rays, but longer than Cosmic Rays. It may be possible to produce rays still shorter than Coolidge did, and which will approach the Cosmic Rays. When these rays are directed at objects, they may be powerful enough to strike an atom and remove some of its electrons; thereby causing atomic disintegration with its resultant destructive effects. So, theoretically, a modification of a Coolidge Tube could be adapted for warfare.

The operation of the Coolidge Tube was described and illustrated in the December, 1928, issue of SCIENCE WONDER STORIES.

2. The power of a telescope depends primarily upon the amount of light entering the first lens. Unless a "hook-up" of telescopes allowed the lens to receive more light, there would be no additional advantage. No matter what is done after the light has been admitted to the lens, everything depends upon the first image. As a matter of fact, the telescopes placed end to end would afford practically no visibility at all, unless the focal lengths of all were carefully adjusted.—Editor.)

The Nearest Stars

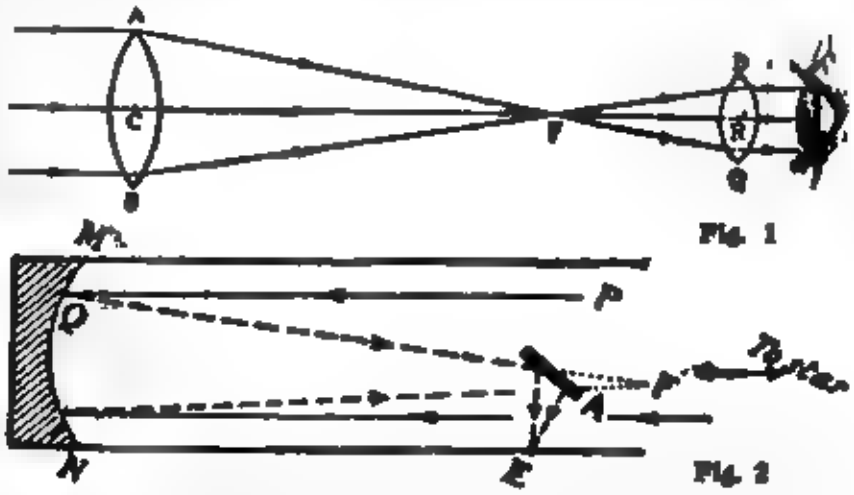
Editor, Science Questions and Answers:

1. Will you tell me the five closest stars, and their dist[illegible]?

2. Which would be the more powerful telescope, an 8-inch refractor or one with an 8-inch reflector?

Edgar Hurd,
Box 22,
Weott, California.

(1. According to Sir James Jeans, the great English scientist, the nearest stars are almost exactly a million times as far from us as the nearest planets. Venus, the nearest planet to the earth, is never less than 26,000,000 miles away; while the nearest star, Proxima Centauri, is about 25,000,000,000,000 miles away.



Showing the differences between the refracting and reflecting telescopes. In the upper drawing, AB is the object glass, CF the focal length, and DQ the eyepiece. In the lower drawing, mirror MN reflects the light of a star toward focal point F. Mirror A reflects the rays to eyepiece E. (From "The Sun, the Stars, and the Universe," by W. M. Smart, Longmans, Green & Co.)

Fig. 1

Fig. 2

However, the sun is a star, and in our opinion it should be numbered among the nearest stars. It is, of course, the nearest of all—93,000,000 miles. After the sun and Proxima Centauri come Alpha Centauri (more than 25,000,000,000,000 miles); Munich 12946 (36,000,000,000,000 miles); Wolf 359 (67,000,000,000,000 miles); Lalande 21185 (69,000,000,000,000 miles); while Sirius, apparently the brightest of all "fixed stars," is 51,000,000,000,000 miles away. It is easier to express these distances in light-years: Proxima Centauri is 4.27 light-years away; Alpha centauri, 4.31; Munich 12946, 5.05; Wolf 359, 6.07; Lalande 21185, 8.33; Sirius, 8.65. Our own sun is 8.3 light-minutes away.

2. The power of a telescope depends theoretically upon the diameter of the large lens and the focal length. In order to answer the question, it is necessary to explain the principles on which the telescopes operate.

In the refracting telescope (Figure 1) the parallel light beams from a heavenly body are caught by the large lens and refracted to converge at a point, such as F, in the diagram. The lens DQ, placed at the focus of F, converts the rays into parallel beams, which fall upon the retina of the eye and produce a sharp image. An object glass one inch in diameter will collect nine times the amount of light caught by the unaided eye; for it is three times as large as the pupil of the eye, which is only 1/3 inch in diameter. An eight-inch refractor therefore, will collect 576 times the amount of light caught by the unaided eye. In the telescope, the magnifying power of the eye-piece is the ratio of the focal length of the objective (CF) to the focal length of the eye-[illegible] (FE). The magnifying power is increased by using eye-pieces of diminishing focal length.

In the reflecting telescope (Figure 2) the mirror has a paraboloidal surface which reflects the entering rays of light in a cone to a focal point F. It is inconvenient to use that point for observation; so a small mirror A, at an angle of 45 degrees to the axis of the reflecting mirror, is fitted within the tube of the telescope and reflects the converging beam to a point E, where the image can be seen. The focal length of the mirror is the distance between F and MN. The greater the focal length, the greater the power of the telescope. The focal length usually depends upon the diameter and degree of curve in the paraboloidal mirror; and therefore the focal length can be made greater or smaller. So, if the mirror in the one case and the lens in the other are of the same diameter, and have the same focal length, it can be seen that their power would be equal. The one which has the greater focal length has the greater power—Editor.)

The Electromagnet

Editor, Science Questions and Answers:

1. What is the best metal to use as a core for electromagnets capable of producing a field of high intensity?

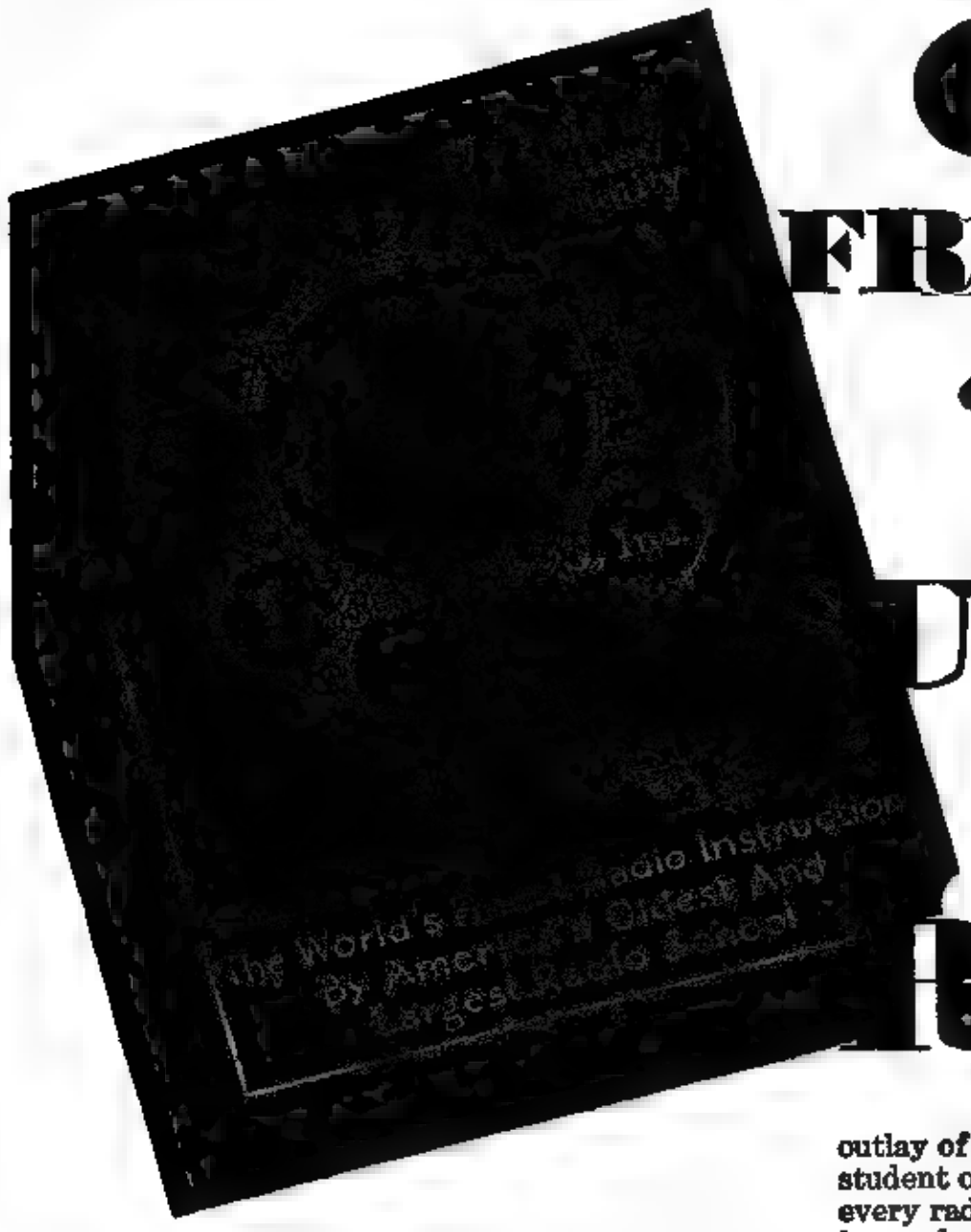
2. What does the word "Maxwell" mean when it is used to refer to a magnetic field's intensity?

George Stehler,
R.D. No. 2,
Uniontown, Ohio.

(1. The best core to use for an electromagnet is soft iron. This is because soft iron has low "reluctance," which means that it does not "prohibit" magnetic flow. It allows itself to be magnetized readily; and can absorb quickly a large amount of magnetism.

2. The term "Maxwell" is a definite unit of measure, like the "ohm" and the "ampere." James Clerk Maxwell [1831—1879], a great Scottish physicist, was the first man to propound the electromagnetic theory of light.

The "Maxwell" is an intricate mathematical quantity. It may be described as the result of the following magnetic phenomena: Two magnetic poles are called unit poles if each, one centimeter square, repels or attracts the other with the force of one dyne, when one centimeter apart. [A dyne is the force which can produce an acceleration of one centimeter per second per second when acting on a mass of one gram]. This magnetic field produced between the poles is called a unit field, and is known as a "gauss" [from the German mathematician, Gauss]. In other words, the intensity of a magnetic field, per square centimeter of cross section, is described by the number of gausses. This, when multiplied by the total area of the cross section of the field, gives us the number of "Maxwells." The "Maxwell" is calculated by a mathematical formula.—Editor.)



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Time Is a Railroad Train

Editor, Science Wonder Stories:

There has been much discussion as to the possibility of time-traveling. The popular opinion seems to be that it is impossible to travel into the past. I agree—if by going into the past you could review George Washington and others of that period.

My theory is this: Time can be likened to a moving train. In moving forward it is traveling in time. We, in the present, are, let us say, in Car 5, with cars ahead of and behind us. To go into the past we go to the car directly back of us. Here we do not find ourselves doing again what we did when our own car was back in time that far. Rather, we might find it full of a *different type of people. They would be in the past—a little behind us in time, but traveling along with us through time.*

Now suppose we are going back through the time train until we reach 1492. We do not find Columbus discovering America. Instead, we find something entirely different. There might be an intelligent race of human beings far in advance of us in science and invention.

R. Conant,
15 Pine Street,
Reno, Nevada.

(We are grateful to Mr. Conant for his happy comparison of time with a railroad train. It will serve to clarify the discussion for many of our readers. While we do not wish to make any statements as to what we might have found in 1492, we are certain that many of our readers will wish to pursue this interesting line of thought, and we shall be glad to hear from them. —*Editor*).

Time Traveling and Reincarnation

Editor, Science Wonder Stories:

The ever-fascinating subject of time-travel is again brought to the fore in your December issue by Henry P. Kirkham's excellent story, "The Time Oscillator." In connection with this story, you ask whether it would be possible for a traveler in the distant past to mingle with people of that time.

The answer is unreservedly NO. If physical participation by modern man in the life of bygone ages were possible, the entire history of the world would be changed. Under such circumstances, all the scientific knowledge, all the discoveries and inventions of our present-day civilization might have been calculated centuries or even millenniums ago.

Similar instances might be cited without end; all tending to prove that *physical* time-traveling is quite impossible. Mr. Kirkham recognized this fact and wisely avoided any direct implication that his characters actually visited some past age; he let the readers draw their own conclusions. In the course of his story, however, he propounded a very interesting theory, namely, that every human being possesses, unknown to himself, a mental chronicle of his entire past.

This idea coincides perfectly with the teachings of Theosophy, by far the most rational religious code ever devised. A major tenet of this creed is reincarnation—the rebirth of the soul after death in another body. According to this doctrine, the memory of each incarnation is retained by the subconscious mind or ego, but is concealed from the physical self. If we could but visualize these hidden mental images as we do the incidents of our present lifetime, what wondrous scenes would we behold! Then, indeed, might we gaze upon events long past; events in which we ourselves took part in former incarnations.

Unfortunately, however, we do not possess this faculty, and the past, like the future, must remain a closed book to us. Nevertheless, the project is a fascinating one; and, though we live in the prosaic present, in imagination we can roam down the ages to our hearts' content.

Allen Glasser,
981 Forest Avenue,
New York, N. Y.

(Mr Glasser's very intelligent analysis of the problems of time traveling brings to mind one of Jack London's remarkable stories—"The Star Rover." In this story, which we advise people interested in time traveling to read, a man is able, by means of "suspended animation," to travel back in time to the bodies his spirit had formerly inhabited. It is the same idea as in time traveling, although it is likely that London never heard of the latest name for the phenomenon.

What Mr. Glasser says about participating in the past is logical. Our own opinion is that the past, the present, and the future are constantly intermingling; that there is no sharp line of division between them; and that if one were to change the plane of his existence he would find constantly that himself either in the past or in the future—in short, in the "fourth dimension." —*Editor*).

ON LETTERS

BECAUSE of the large number of letters we receive, we find it physically impossible to print them all in full. May we request our correspondents, therefore, to make their letters as brief and to the point as they can; as this will aid in their selection for publication? Wherever possible, we will print the letter in full, but in some cases, when lack of space prohibits publishing the complete letter, we will give a synopsis of it in a single paragraph.

Time Traveling and Television

Editor, Science Wonder Stories:

In your recent issues you stated that you wished to have some views on time traveling. I disagree with the author of "The Time Oscillator" on the main point of his story. That is, my idea of time traveling is entirely different from his. I rate the television and time traveling very closely. Here is a brief account of a trip:

I decide myself with the necessary apparatus, and start my "Time Machine." Instead of my traveling to some distant city of the future, the city travels to me, and when I awake I notice the changed scene, but I am still in the same room. As with the television, I am looking from one plane into another; and—not as with the television—I am really among the people of this city, but I am invisible because I am not really there. This forms a very remarkable paradox, but it can be more easily understood if you take the principle of the television; and if you are able to pick up images that were not broadcasted, you could find that with a little improvement you could pick images out of the future and past as well as the present.

Using this as an explanation, I am willing to uphold my theory that if I were to use a "Time Oscillator" I would have as much effect upon the persons I saw as you have upon the persons you see in a television broadcast.

G. E. Bush,
694 Jefferson Avenue,
Brooklyn, N. Y.

(We have received many comparisons of time travel with familiar things, but this idea of television is particularly appropriate. It is our own opinion that if we were able to travel into the future or the past, we would be only spectators, and would take no part in the actions of the people, past or future. Mr. Bush has stated our own idea in a very vivid and convincing manner.—*Editor.*)

Can a Man Kill in the Past?

Editor, Science Wonder Stories:

I am writing to give my opinions about time-traveling. If a man went back and killed his grandfather [illegible] he would not [illegible] born. But the fact that he had been born would prove that he couldn't play a *physical* part in the past.

Edgar Hurd,
Box 22,
Wyatt, California.

(This very short, and very direct opinion [illegible] to point conclusively to the fact that we [illegible] participate physically in the past. The question, however, is fascinating, and we invite further comments.—*Editor*).

Is Time Abstract?

Editor, Science Wonder Stories:

In regard to the time traveling stories, I want to say something. Somehow I have always considered time as abstract. I can't consider time as being in the field of matter, force, energy, or radiation. And to travel in time seems to me to be a fallacy. The old argument of going back to shoot your ancestor when he is a boy, and preventing your own birth, is good. But here's one that I think is just as good.

For the sake of argument let us suppose that our descendants become advanced enough to travel in time. Thousands of years from now the machines may be constructed and developed. The people would take a trip back and end up in primitive times. Then, if they took the machine with them, our earliest ancestors would be capable of traveling in time, and so would everyone hereafter, until the time limit of the human race.

By this I mean that the human race could not become extinct, as time explorers going into the future could see every calamity approaching, and the entire population could spend all eternity traveling between the "time-limit" in the future and the one in the past, or before the earth became habitable. You can see for yourself the complexities arising from this subject, making it an utter fallacy.

For the reason stated, let us say that travel into the past is impossible. Now, I don't think travel into the *future* is impossible, but it would be impossible to return. For that matter, one may just as well get there by sleeping 40,000 years, or being knocked into the middle of next week by a truck driver.

The only way I can see to "travel" into the past is to take Dr. Lamb[illegible] up on his proposition to capture light waves which are reflected back to us from distant stars, showing the Battle of Bunker Hill, Caesar's assassination, and other historical events.

P. J. McDermott,
6834 South Michigan Avenue,
Chicago, Ill.

(We are afraid Mr. McDermott has created some fallacies himself. We have stated repeatedly that, in our conception of time travel, it may be possible to go back into the past as a *spectator* only. That is, the time traveler [illegible] never take part in the actions of the

(*Continued on page 1047*)

SCIENCE NEWS
MEDICINE

(*Continued from page* 1039)

BRAIN OPERATION AIDS CURE OF EPILEPSY

Epilepsy caused by injuries to the head has been successfully treated by delicate operations on the brain. Dr. Wilder Penfield, Montreal surgeon, has made a specialty of operations of this type, and he describes their use in "traumatic epilepsy." To determine if there has been a brain injury, an encepha-photograph is taken. This is an X-ray photograph made after air has been injected into the spinal canal. The air goes to the brain and is photographed, the shadow on the plate disclosing the affected brain area. The operation is performed under a local anaesthetic, and in most cases it is better to remove the scarred area than to leave it.

TUBERCULOSIS CLUE FOUND IN NEW HUMAN CELL

The apparent immediate cause of tuberculosis has been discovered to be a new type of sugar cell generated by tuberculosis germs. This cell is said to act as the agent of union between the tuberculosis bacillus and the human cell. The discovery was made as a result of research work in the Sterling Laboratory at Yale University and the Rockefeller Institute for Medical Research in New York. It is possible, therefore, that a cure for tuberculosis may be effected by striking at the sugar and interrupting its chemical function.

In tuberculosis, two living factors are concerned—the body cells and the bacilli, which become parasites on these cells. When the relation is established, there follows a chemical activity of special nature, which causes tuberculosis. The chemical substances produced in various types of the disease are sugars; and hope for a cure of the disease lies in the possibility of our causing light and various other catalysts to swing the sugar-albumin or sugar-fat combinations one way or the other. All hope lies in the possibility of finding some way of interrupting the chemical union between the bacillus and the cell.

PHYSICS

VACUUM TUBE PRODUCES ARTIFICIAL RADIUM RAYS

Artificial radium rays, produced by 1,600,000 volts of electricity in special vacuum tubes, have now been achieved by physicists at the Department of Terrestrial Magnetism of the Carnegie Institution of Washington. The tubes are really X-ray tubes and, by applying voltages of from one-half to several million, rays similar to the gamma rays of radium are emitted. The other kind of radium rays, known as alpha and beta rays, can be produced by suitably modifying such a tube. The tube is composed of many separate X-ray tubes, with the rays feeding from one into the next. The entire battery of tubes is immersed in oil, while each one is individually shielded from the others. This makes possible smaller tubes, and higher voltages, than Dr. W. D. Coolidge, of the General Electric Co., used in a somewhat similar experiment.

BEAM OF LIGHT STOPS GERMAN LOCOMOTIVES

A flashing beam of light, reflected back to a locomotive from a mirror on the signal post, is the latest protection for railways. The new device is being tried out over a stretch of several hundred miles of the German State Railways, between Berlin and Munich. From a small searchlight on the front of the locomotive a narrow beam of light is thrown upwards, all the time the locomotive is in operation. A ring of light-sensitive cells is located around the searchlight lens. When the train comes to a signal post, the mirror on the post reflects the light back to one of the cells. This starts an electric current, which makes a visible

(*Continued on page* 1045)

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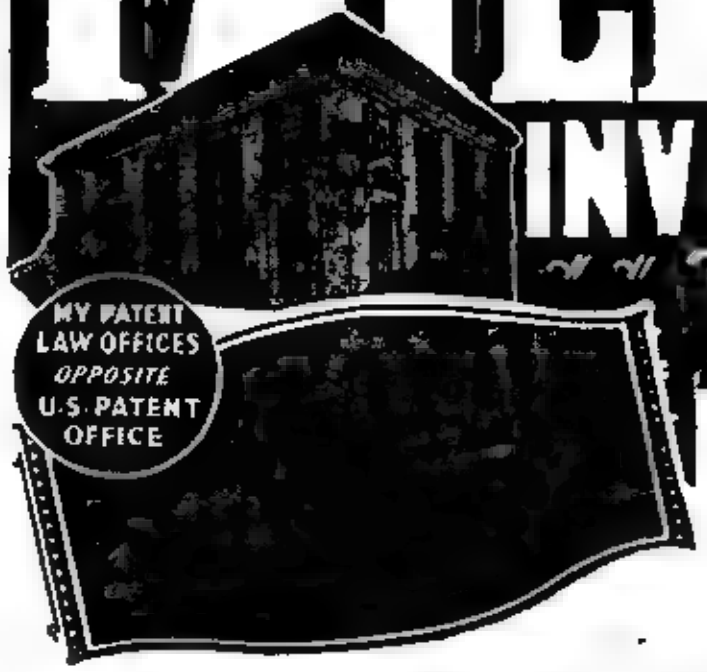

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SCIENCE NEWS
PHYSICS
(*Continued from page 1043*)

signal in the engine cab, and remains until the engineer acts on it, if he does not respond promptly, the train is stopped automatically. Movement of the mirror on the post determines which cell will receive the reflected light, and what signal will be given the engineer.

SUNSET VOLTAGE GREATER THAN SUNRISE

The electric voltage of a sunset is 2,000 volts higher than that of a sunrise, according to the *New York World*. Day and night, three vast electric currents, like rapid tidal floods, rush around the spinning earth in layers of the air eighty or ninety miles above the surface of the earth. On the night side of the globe there is one electric current flowing continually eastward and totalling about 3,000,000 amperes, equivalent, at the 2,000-volt potential, to about 8,000,000 horsepower. On the day side of the earth there are two currents one above the other, the upper current flowing eastward, and the lower westward. These gigantic electric flows are not like ordinary currents in wires, but are vast drifts of charged air particles. These discoveries are the result of research done by Dr. E. O. Hulburt of the Naval Research Laboratory in Washington.

RADIO

TEN-METER WAVES CROSS OCEAN

Ten-meter radio waves have been considered useless for communication work, but recently they were used in transoceanic code transmission. Two-way communication was established by an amateur in Montclair, New Jersey, and amateurs in Denmark and South Africa. Preparations are being made for the transmission of voice around the world on a twenty-meter wave, which uses little power. The latter problem is more important, since it will make the human voice audible round the world, and various contests held by amateurs have done a great deal to promote the development of radio channels which would otherwise be unused.

STUDY OF EARTH'S MAGNETISM AIDS RADIO BROADCASTS

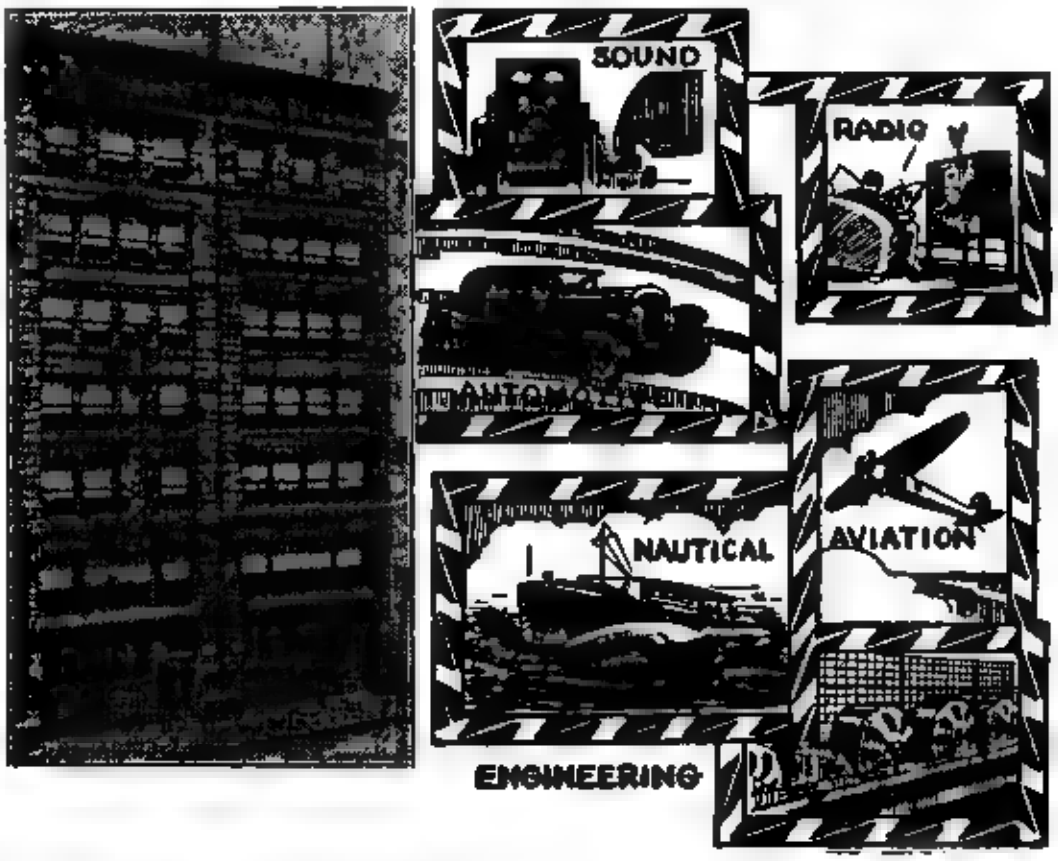
It was the discovery of the earth's magnetism that made possible the discovery of America, says Commander N. H. Heck, of the U. S. Coast and Geodetic Survey's division of terrestrial magnetism and seismology. But these early magnetic observations were very crude, and the very delicate measurements that scientists have been making in the last quarter of a century have had many practical applications. Observations are analyzed and correlations with other phenomena studied, as for example, sun spots and magnetic storms. The correlation is good over a long period, but many exceptions indicate that we are dealing with a common cause of both. Atmospheric electricity and earth current are part of the same phenomena and they too must be studied. The aurora gives special opportunity, since it can be photographed and otherwise studied.

RADIO SQUEAL UTILIZED

The squeal of a radio set has been turned to harmony, in the first organ to be operated by electrical circuits rather than by wind pipes. The instrument is very small—one-hundredth the size of the conventional pipe organ—and produces clear musical sounds. It is based upon the squeal of a radio set. By regulating the pitch of the squeal, and by utilizing several tubes, each controlled by a keyboard similar to that of a piano, pleasing musical tones are produced. The range of the electric organ comprises over three octaves of musical tones, and can be extended to any desired limit. Middle C is approximately in the center of the range of the device. An advantage of the electrical organ for radio broadcasting lies in the fact that the problem of placing the microphone to catch sound waves is obviated. The electrical tones can be sent directly to the radio station without ever being heard as sound waves before broadcast.

(*Continued on page 1046*)

"ELECTRICAL OPPORTUNITIES"



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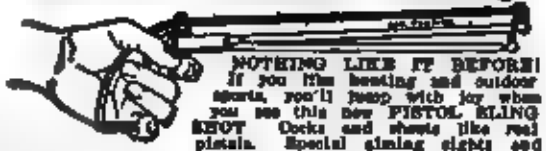

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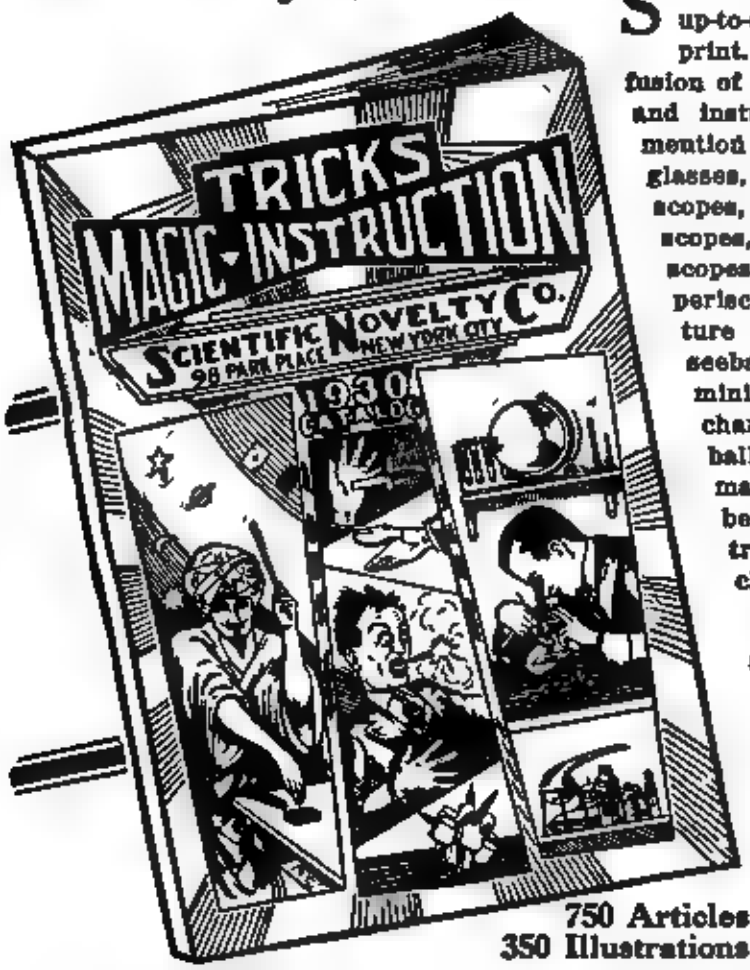

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SCIENCE NEWS OF THE MONTH
GENERAL

(*Continued from page* 1045)

MILLIKAN URGES "ESSENTIAL RELIGION"

Professor Robert A. Millikan, the great physicist, and discoverer of the "Cosmic Rays," has declared that there is no incompatibility between science and the essential purpose of religion in developing the conscience, ideals and aspirations of mankind. The scientist believes that "essential, and not dogmatic religion" is one of the world's supremest needs. Individual religions often contain this essential, and much that is objectionable. There is no conflict, and there can be none, between science and this essential. All the conflict in the past and present is the result of the insistence on the dogmas of the various creeds.

SUBMARINE "LIGHTNING" OBSERVED

A remarkable phenomenon, likened to submarine "lightning," has been reported by a British sea captain. In passing through the Gulf of Martaban (near India) the vessel entered an area of numerous small phosphorescent globules which rose from below, breaking on the surface. Later they resembled vivid flashes of lightning under water, but rapidly formed dazzling beams, radiating under the steamer in curved lines thirty feet wide and revolving to the right and left from a center five miles away. The ship's compass was not affected, and no difference was noted in the steering, but the engine revolutions decreased in number This led to the conclusion that the phenomenon, which lasted about fifteen minutes, was probably the result of a submarine volcanic disturbance.

BODY AND SOUL ONE, SAYS PSYCHIATRIST

Dr. Eugen Bleuler, of the University of Zurich, has stated that body and soul are one and indistinguishable. Some reflexes are purely mental in origin, according to the physician, while others spring solely from physical stimuli. He conceives the body as an organism composed of many individual cells, each a conscious part of a conscious whole. For example, a smashed finger, when it heals, resumes in time its normal shape and size. This would be impossible if the cells composing the member were not conscious of the task before them. The interrelation of mind and body is so complex that it is impossible to differentiate between what most persons define as physical and spiritual.

INSECTS A CHALLENGE TO MAN

Allen Schoenfeld, writing in the *New York World*, describes the battles that are constantly taking place between the insect world and the world of man. Scientists and chemists are battling ceaselessly the insect pests which, if they were not overcome, would destroy human civilization. The fight has been going on for years, and it was predicted some years ago by Dr. L. O. Howard, then Chief of the Bureau of Entomology of the United States Department of Agriculture, that there would come a day when insect hordes would sweep relentlessly over the earth and push civilization into oblivion.

The history of the Japanese beetle is indicative of what we may expect. Thirteen years ago it was introduced into the United States. At that time it was thought the pest could be kept in a restricted area. But we know now that the beetle can never be exterminated; and in about fifty years the insects will spread over the entire United States. Dr. Austin H. Clark, famous entomologist of the Smithsonian Institution, has stated that the slow rise of an infinite variety of insects and their apparent ability to spread and multiply in spite of all we can do is the first faint sign of a coming age—the age of insects. Dr. Clark's researches have shown him insects which "use tools, wear clothes, weave and sew, keep domestic animals, and adhere strictly to the rules of rigid social systems in which the rights of private property are freely acknowledged." He has found them constructing nests, cells, tunnels, turrets, snares and pitfalls which show an engineering skill and a knowledge of the laws of physics equal to our own.

THE READER SPEAKS

(Continued from page 1042)

past. We grant that Napoleon is dead—he has been dead for about a hundred years. But it may be possible to go back in time and observe him in his glory, in spite of the fact that we know he is dead. We would be moving in a world of shadows, as Dante moved through purgatory. We would see the light waves re-create the figures of the past. It is the same with the future. We admit that traveling into the future would be harder than traveling into the past, for the reason that light waves would not yet be created to represent the future events. We may travel into the future as spectators and watch the present catch up with us. This seems plausible, and is a theory which admits of a great many developments.

Mr. McDermott falls on his own definition. He admits that time is abstract and yet when he pictures time traveling, he shows it to us as being purely physical. Now time traveling is also to a certain extent abstract; and one might say that instead of going back to the past physically, he bends the arc of time so that for him the past and present meet. We recommend this thought to our readers.—*Editor.*)

Mr. Taylor Replies

Editor, Science Wonder Stories:

I have just received the March issue of SCIENCE WONDER STORIES and wish to use the columns of "The Reader Speaks" in replying to a few of the many attacks made on me.

First I will take up Mr. Allen Glasser. He seems to have forgotten that in the last few hundred years scientists are beginning to learn some of the wonderful scientific truths taught in the Bible. For instance: more than a thousand years before Christ, the Bible taught that the air had wings. In comparatively modern times man has learned by study and experience what the Bible taught more than a thousand years before Christ. They have also found that the earth is round and that the ocean is round. The Bible taught that 700 years before Christ; that both land and water were circular in shape. The Bible teaches why the needle of the compass turns north. The very revolution of the earth is taught in the Bible, and also that rain is the evaporation of the water in the ocean. These things man has learned in these modern time; and then they are just swelling out with self-pride because they have learned what the Word of God taught centuries ago.

The very inventions of these last days are foretold in the Bible. Daniel 12:4, "But thou, O Daniel, shut up the words, and seal the book, even to the time of the end: many shall run to and fro, and knowledge shall be increased." With that Nahum 2 3-5, "The shield of his mighty men is made red, the valiant men are in scarlet, the chariots shall be with flaming torches in the day of his preparation, and the fir trees shall be terribly shaken."—Did you ever see a train going through the night with the great electric torch and belching smoke? "The chariots shall rage in the streets"—and I think that some who read this can testify that they do and we have to dodge them, sometimes by a narrow margin. "They shall justle one another in the broad ways. They shall seem like torches, they shall run like the lightnings." How aptly that describes our lightning express, especially as it goes thundering through the night. Also, they have already made automobiles go over 200 miles an hour. "They shall stumble in their walk;"—I guess we have all done that in the trolleys and trains. "They shall make haste to the wall thereof, and the defense shall be prepared." More than once I have gotten hold of the rail or the strap in the trolley and on the trains, to keep on my feet.

The Bible foretells that learned men in the last days would deny the Bible and teach evolution. I don't think I need to explain again the ridiculousness of it. The Bible says that the Lord is our father and that we are made by Him. But the people prefer to believe that we came from a lower order of life instead of from the Divine Hand of God. But the Bible foretells that they would do that; that the rich would get richer and the poor would be made poorer. It foretells the great peace talk that we have to-day; also the insect pests that are devouring our crops and how the seed would

(Continued on page 1048)

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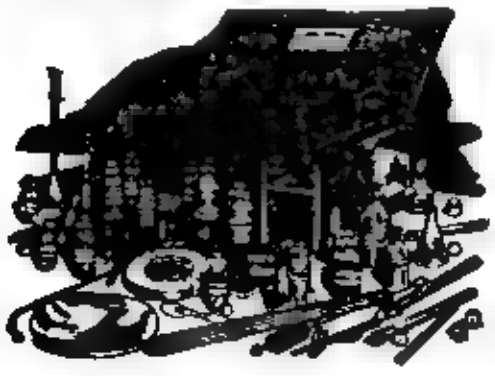

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THE READER SPEAKS

(*Continued from page 1047*)

rot in the last days. I tell you the Bible is the most up-to-date book in the world because it is ahead of events.

I could take time for a lot more, but I believe I have already written enough to cover a column. I will be glad to hear from anybody that wishes to criticize me.

Curtis Taylor,
102 Grove Place,
Utica, N. Y.

(As we stated in the comment on Mr Glasser's letter, the Bible is valued by intelligent and cultured people for its profound psychological truths, and for the beauty of its language. We are sorry Mr. Taylor does not give the citations for the first remarks he makes concerning the scientific knowledge of the Bible. The citations that seem to be applicable to present-day conditions are very interesting. Our own stand on this question is concerned principally with science and not with religion. We do accept the theory of man's evolution from a lower form of life—but we do not affirm or deny the wisdom or knowledge of the Bible on these questions.—*Editor.*)

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"The Flying Legion"
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"How High Can Man Fly?"
By Lieutenant Apollo Soucek

From an Amateur Astronomer

Editor, Science Wonder Stories:

I started to read your magazine only recently, and since then I have introduced it to three of my friends. I have graduated from high school, and it may seem queer that I am reading this type of magazine instead of the usual stuff. But then I am interested in science more than anything else, except music, my vocation. I am so interested in science that I have even gone so far as to purchase a small-power telescope to observe the stars. I have also made many trips to the Swarthmore College Observatory, which is close by my home, and have seen the "canals" on Mars, the falling stars, the Milky Way, and so forth.

All your authors are benefactors to science fiction, and therefore to science. Their motto is "Nothing is impossible." *Yours*,

Alfred Pike,
Chester, Pennsylvania.

(We are very glad indeed to know that Mr. Pike has become an amateur astronomer through the influence of our magazine. We receive many letters telling of our educational effect, which is one of the principal reasons for the existence of this magazine. Astronomy, the "queen of the sciences," is the most fascinating subject imaginable, and we would like to see more of our readers becoming amateur astronomers, visiting observatories, and increasing their knowledge of the universe. One of man's greatest pleasures is the exercise of the intelligence and imagination which distinguish him from the other animals.—*Editor.*)

(*Continued on page 1049*)

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THE READER SPEAKS

(Continued from page 1048)

Dr. Keller Answers a Question

I've been fascinated by "The Conquerors," but wonder if Dr. Keller wouldn't be willing to relieve some irritation by answering some questions about it.

Is is reasonable to suppose that Navy aviators would come down without knowing what symptoms of trouble their motors developed?

Is it reasonable to suppose that the United States Army would stand around and do nothing while the population of several States was driven forth by the Conquerors' mysterious fog for a whole year? Wouldn't they go into this territory with gas masks or something and try to locate this mysterious enemy?

Wouldn't some attempt be made by the government and the public service companies to find out what kind of force mixed up the electrical machinery, gathering and studying data of where, how and when these phenomena manifested themselves? Wouldn't they devise test apparatus to carry across the invisible line, and at least observe in detail the phenomena of its going out of commission and make at least some deductions therefrom over the course of a year?

But as near as I can make out from Keller, the fog just stayed, and nobody could stand it, and everybody cleared out and it was just too bad, and nobody had gumption enough to do anything about it.

Strangely enough, desperate efforts were made to apply steam power to airplanes—quite forgetting rocket planes and gliders such as were getting quite common in 1939, according to the article right next to the story.

Let's imagine things by all means. But for the love Pete, let's keep our imaginings reasonable and plausible on the basis of the premises laid down for the story.

But perhaps Keller has some scientific explanation for this terrible lethargy and demoralization. Has he? Or have you?

J. T. O'Shea,
2851 North 7th Street,
Philadelphia, Pa.

Dr. Keller's Answer

Evidently Mr. Shea was perplexed both by the mental and the patriotic inertia of the patriots of the United States in failing to withstand the attack of the Conquerors.

Suppose I give you a concrete example. No doubt you are acquainted with the bravery of the Colonists at the time of the Revolutionary War. Now suppose they had been attacked in a different manner by the British, without any previous opportunity to prepare themselves. Let us imagine that the English had used all the modern instruments of scientific warfare. What if Washington had been opposed by poison gases, airplanes, submarines, tanks, machine guns, and 16-inch naval guns? What if the enemy had used radio, telephones, and automobiles as means of communication? Do you suppose that the scientists available to the American forces could have developed sufficient scientific knowledge to have formed an effective defense?

Now something like that happened when the Conquerors told the people of the five States to get out and stay out. The Conquerors were at least fifty thousand years intellectually in advance of the scientists of the rest of the world. When they started to interfere with the airplane travel they were making use of a force that would not, under ordinary circumstances, become known to the average scientist for some thousands of years at least. There has been such rapid advances made in scientific discoveries in the last 50 years that the average person thinks there is no limit to the possible discoveries of the next five years. I personally feel that we have only discovered a thousandth part of what will be discovered in the centuries to come. The scientists of the United States simply did not discover what was disabling their planes and interfering with their electricity because they were not sufficiently advanced to do so. As for using steam or the rocket plane, I suppose it could have been put in the story. Certainly not the rocket plane, but perhaps the Diesel engine. However, it was not done in this story. You notice that so many of the pilots were killed that it was felt to be a useless waste of life and so was stopped.

(Continued on page 1050)

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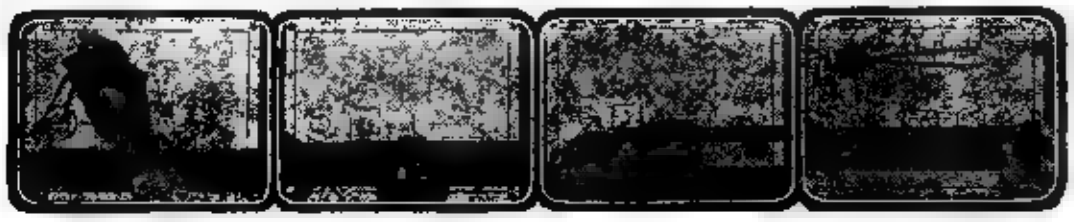

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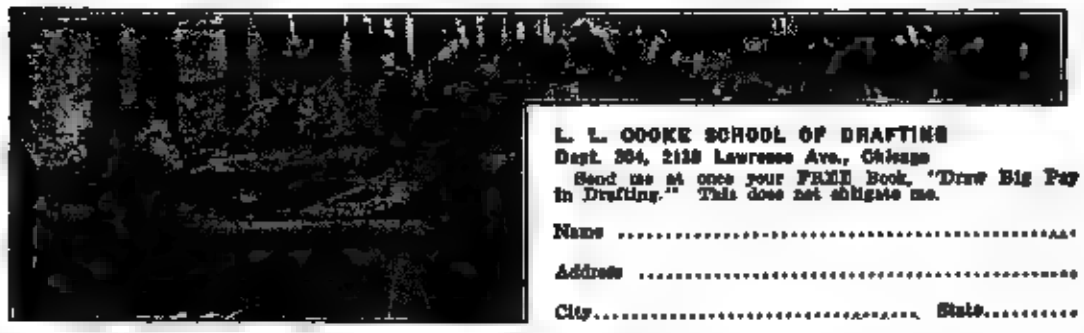

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Turn to page 1049 of this issue and read the interesting announcement of the new SCIENTIFIC DETECTIVE MONTHLY.

Editor, SLOGAN CONTEST,
SCIENCE WONDER STORIES,
96-98 Park Place, New York City.

SEE PAGE 1036
4-30

Gentlemen:

I have written below my entry in your $100.00 Prize Slogan Contest.

.....

Name .....

Occupation..... *Age*.....

Street Address .....

City..... *State*.....

THE READER SPEAKS

(*Continued from page* 1049)

Now in regard to the fog. The people of those five states were not cowards. They would have fought to the end a foe they could have seen. But it was the constant wetness, the slime and the rapid decay of everything that finally drove them into a panic. Personally I think that if I had been forced to live for very long under such surroundings, I would have done the same thing—that is, get out. Would you have stayed there? It was not a question of bravery. Had there been an enemy, the nation would have sent in five million men, but whom would they have fought had they gone in? What would they have done? At any moment the Conquerors were ready to scatter over the entire earth a new disease germ that would have wiped out humanity. The fact that the leaders of the United States were willing to wait till they *understood just what they were fighting against was a sensible thing.*

DAVID H. KELLER.

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Be sure to procure a copy from your news stand. On sale March 15th.

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"The Stone from the Moon," by Otto Willi Gail
"The Ape Cycle," by Clare Winger Harris
"Via the Hewitt Ray," by M. F. Rupert
"The Thought Materializer," by F. R. Long
"Within the Planet," by Wesley Arnold
"Moon Rays," by Dr. David H. Keller

Appreciates Dr. Breuer

Editor, Science Wonder Stories:

I feel that I must write you about the merits of that wonderful story called "The Fitzgerald Contraction," which I consider a masterpiece. That is a *real* science fiction story (with the accent on the science) and the kind I enjoy reading. Dr. Breuer has taken a difficult subject, and expressed it so clearly, at the same time proving his statements so logically that any non-technical person can well understand his theory. The story is so well-thought out, and written in such a masterful way, that it is perfectly evident that the author went at it in a very careful, methodical manner, and made a thorough study of his subject. I am delighted with this story, and hope we may read many more like it. There is one point over which I have some doubts, and that is that if the space-ship had, as the author says, a swimming pool, I do not believe that the water would stay in the pool, but would, as a result of the absence of gravity, float around in the form of spheres. Am I correct in this assumption?

Allan F. Stern,
2995 Lincoln Boulevard,
Cleveland Heights, Ohio.

(Dr. Breuer's story has roused more comment than any short story we have published for some time, for the reason that it is so much in accord with the theory of relativity and with the mathematical applications of that theory. Mr. Stern's appreciation is genuine, and shows an intelligent understanding. As to the water in the swimming pool taking the form of spheres and floating in the air: Because of the very fact that the people in the

(*Continued on page* 1051)

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THE READER SPEAKS

(*Continued from page 1050*)

space-ship had a swimming pool, it is taken for granted that they had some means of producing gravity locally, in order to have their trip as comfortable as possible. Mr. Stern is quite right when he suggests that the water would flow around the walls at the slightest motion if there were no gravity.—*Editor.*)

The Atom

Editor, Science Wonder Stories:

I would suggest the advisability of avoiding definite statements as to the constitution of the atom. All such theories are entirely inferential, and at the present time there are three distinctly different theories used by different scientists. Sometimes different theories are used by the same scientists for various purposes. The Bohr and the Langmuir atoms differ from one another in that in one the electrons are supposed to revolve, and in the other are supposed to be stationary. Both of these have been to some extent superseded by the Schrödinger wave mechanics theory which does away with both of these ideas and represents the atom as a pulsating center of indefinite, in fact, unlimited radius, and as not having revolving electrons at all, the electrons being simply phenomena of pulsation. We are not yet at the beginning of real knowledge as to the constitution of matter, and in the meantime hard and fast conceptions are apt to cripple intellectual progress. Many scientists are now openly expressing the opinion that the material world is a psychological phenomenon, and not a self-sustaining physical one. My opinion is that the ultimate truth will be found somewhere between the materialistic view and the purely psychological one.

A word as to Prof. Kirtley Mather's claim that science and religion no longer conflict, which is quoted by you on page 851 of the February issue. It is true that some kinds of science do not conflict with some kinds of religion, but then this has always been the case. Those who like to take the syncretic position can always pick out some form of religion which does not conflict with science. Let me, however, relate an incident which has just occurred, and which shows that we are a long way from the ending of the conflict between science and religion. Dr Horace Day, speaking at Howard College in Alabama, remarked that there are some people so ignorant that they still believe that Noah crowded two of each species of animals into the ark during the flood. He then remarked that, having studied whales, he found it impossible to believe one of them could have swallowed a man whole, as in the alleged case of Jonah, and furthermore that no man could live long in a whale's stomach. At this point two professors left the hall. A student rose, waved a bible and said, "I hope God will bless you and show you your mistake." The entire assemblage then left and knelt in a long prayer for the soul of Dr. Day. Thereafter the college asked for his resignation and received it. If this were an isolated case, it could be lightly dismissed, but it is the prevailing spirit of religion not only through most of the Southern states, but in a great many of the smaller cities and rural districts, including many in California. Science has had to make its way from the first by a desperate fight against religious bigotry, and it is yet much too early to advocate any laying down of arms.

Victor A. Endersby,
Box 1185, Route 1,
Manteca, Cal.

(It is quite true that there are three different conceptions of the atom, and that these conceptions differ in the respects Mr. Endersby mentions. The definitions of the atom which we constantly give in our question and answer department is the one accepted by most of the eminent scientists, and, in our opinion, is the one most solidly established. Since the atom is still a theoretical quantity, and the electron a mathematical quantity, as Langmuir says, we cannot force anyone to adopt opinions which coincide with ours. We are assuredly not trying to cripple intellectual progress by giving hard and fast rules for anything. This is indicated quite clearly in our acceptance of the

(*Continued on page 1052*)

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THE READER SPEAKS

(*Continued from page 1051*)

Einstein theories, and in our losing of several of our scientific concepts upon them. We do agree with Mr. Enderaby when he says that our knowledge of the atom is just beginning. It may be said, in a larger sense, that we have not obtained a clear idea of the constitution of matter, in spite of the fact that different theories differ in their points. There will never, we feel, be complete accord, and it is fortunate for science that agreement is never general. If it were, scientific progress and research would be seriously hampered.

The statement as to religious and scientific harmony was made in reference to intelligent, educated, broad-minded religious leaders, and probably did not take into account any bigotry or narrow-mindedness. But we are perfectly content that there are two sides to the scientific religious question, each trying to maintain its point of view. From conflict comes new truth. And we should remember that just as there have been "professional theologians" who have made their living by attacks on science, so there are "professional scientists" who delight in attacking organized religion. The intelligent person will guard against both of these.—*Editor.*)

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Another Club

Editor, Science Wonder Stories:

Recently there has been formed a national club for the discussion of science by correspondence. Still more recently there has been formed here in Boston a branch of that national organization. If there are any people living in Boston and vicinity who are interested in the discussion of science, I would be very pleased to have them write me.

Robert B. Konikow,
Secretary, Boston Chapter,
Science Correspondence Club,
497 Warren St., Roxbury, Mass.

The Fitzgerald Contraction Equation

Editor, Science Wonder Stories:

In the February issue of SCIENCE WONDER STORIES, on page 862, you publish something which I am unable to understand. Why is it that if V = 100,000 in the Lorenz-Fitzgerald equation, L1 = .068L?

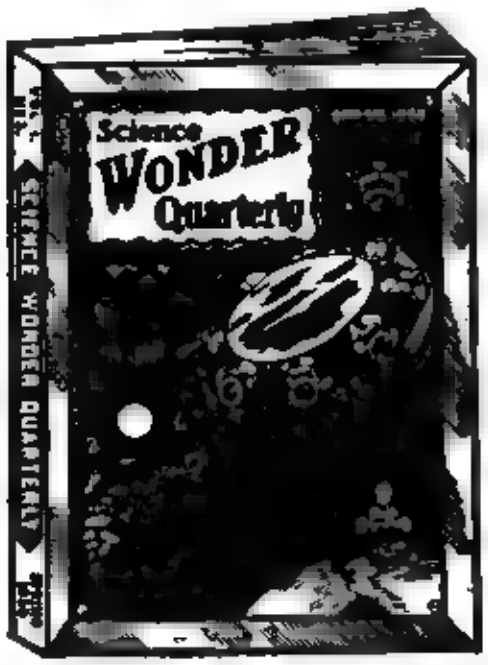
Any value for V greater than 1 will make L1 imaginary the way the equation is stated.

F. E. Austin,
11 South Park,
Hanover, N. H.

(In the equation $L1 = L\sqrt{1-V^2}$, V is the fraction that represents S/C where S is the speed of the body and C is the speed of light. Mr. Austin's question is quite justifiable and we hope that our explanation will clear up his doubt.—*Editor.*)

Announcement!

The great Spring issue of the SCIENCE WONDER QUARTERLY will be on the newsstands March 15th — — —



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BOOK REVIEWS

HUMAN HISTORY, by G. Elliott Smith. 472 pages, profusely illustrated, stiff cloth covers, size 6" by 8¼". Published by W. W. Norton & Company, New York. Price, $5.00.

Professor Smith, of the University of London, is a world-famous authority on anthropology and sociology, and his *Human History*, a monumental achievement, may be regarded as the first work of its kind to unify cultural and biological history to produce a history of man, rather than of men. Dr. Smith upholds the thesis that culture originated in ancient Egypt, and nowhere else; and he denies the development of a separate society among the Indians of the American continent.

Nevertheless, in spite of what one may think in regard to these rather positive statements—which are still open to argument—the fact remains that Dr. Smith has epitomized the work of a lifetime of research in his remarkable book. He draws upon his vast stores of knowledge, and upon the knowledge amassed by the generations before us to illustrate the progress of cultural and biological development in man. *Human History* brings to history the methods of science; and Dr. Smith, in combining the scientific basis of *The Origin of Species* with the cultural scope of *The Golden Bough* and Buckle's *History of Civilization*, has traced the history of man, not for 2,000 years, but for 200,000 years. He has given the general reader the knowledge of the scientist combined with the understanding of the humanist.

LUCK, by Lothrop Stoddard. 336 pages, stiff cloth covers, size 5½" by 8¼". Published by Horace Liveright, New York. Price, $2.50.

Luck is one of the elements of life. Under various names—chance, gambling, coincidence—it has had a great deal to do with the building of careers, and even with the formation of nations and the development of international strife. Dr. Stoddard has made an exhaustive study of his subject, has gathered hundreds of stories, and interviewed any number of prominent people in whose lives luck was the deciding element. His book is of the utmost interest to every person; for chance figures in the life of every individual, and no one can discount its potency. As a matter of fact, there is a mathematical theory founded upon chance—the theory of probabilities. In this volume one may find any number of anecdotes which tell of the value of luck in life and in destiny. There is, also, a history of luck through the ages; an account of the development of the various luck "cults"; and a discussion of the relation of luck to religion, science, gambling, and sport—a discussion of luck as the "universal element."

DUST TO LIFE, by Burton Peter Thom, M.D. 409 pages, profusely illustrated, stiff cloth covers, size 6" by 9". Published by E. P. Dutton & Co., New York. Price, $5.00.

Among the various worth-while books on evolution, *Dust to Life* is certain to take a prominent place. Dr. Thom has written what may be called a scientific Genesis. He combines the knowledge of scientific research with the drama and sonority of the Biblical account of creation, he takes the reader into those dim ages before man existed, when the earth was dominated by giant reptiles and other prehistoric monsters, before a human being had attained to the dignity of his rank among animals, or taken cognizance of the fact that he was different from the other creatures that roamed the earth and disputed with him the possession of it.

Dr. Thom goes farther than mere biology; he gives the structure of the universe, from the atom to the solar system, and explains man's particular place in the vast scheme of things. His chapter headings may serve to give an inkling of the vast fund of information and pleasure between the covers of his book: "The Beginning," "What the Rocks Tell," "The Way of Life," "Up from the Slime," "The Dragons," "The Sea Beasts," "The Wings of the Morning," "The Milk Givers," "The Couriers of the Dawn," "The Earth Shakers," "The Making of Man," "Man." The 122 illustrations in the volume add greatly to its fascination.

(Continued on page 1054)

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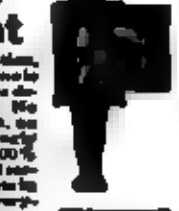

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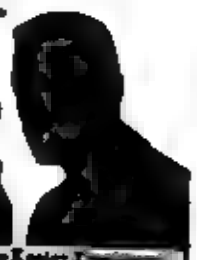

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BOOK REVIEWS

(Continued from page 1153)

LONG AGO TOLD, by Harold Bell Wright. 290 pages, illustrated, stiff cloth covers, size 5½" by 8½". Published by D. Appleton & Company, New York. Price, $2.50.

Harold Bell Wright, famous as the author of many "best sellers," has spent a great deal of time in Arizona and the southwest collecting the legends of the Papago Indians. These Indians have a history as old and as interesting as that of any other primitive people, and Mr. Wright has set forth in his book an English version of their original folklore. The tales, which deal with the origin of the sun and moon and stars, and the origin of various plants and animals, are recounted with perfect simplicity, and seem true to the spirit of the legends. The illustrations by Mrs. Katherine F. Kitt are particularly appropriate to the subject matter. *Long Ago Told* is a permanent and valuable contribution to American folklore.

THE COMMON HEAD COLD, by Walter A. Wells, A.M., M.D., F.A.C.S. 225 pages, illustrated, stiff cloth covers, size 5" by 7¾". Published by the Macmillan Company, New York. Price, $2.75.

Dr. Wells is an authority on oto-laryngology, and his book deals with the practical applications of his great fund of knowledge—with the question of the contagion of colds, with drafts, vaccines, cold remedies, sprays, gargles, the removal of tonsils and adenoids, and other important points connected with a malady which is almost universal. In the United States alone colds cause a loss to industry of over $450,000,000 a year. A book dealing with this affliction deserves the most careful consideration.

THE PSYCHOLOGY OF THE INFANT, by Dr. Siegfried Bernfeld. 309 pages, illustrated, stiff cloth covers, size 5½" by 8¾". Published by Brentano's, New York. Price, $4.00.

This book by an eminent authority is one of the volumes in The Library of Educational Psychology. It is the culmination of years of research and experiment, and may be regarded as authoritative, containing, as it does, the conclusions of the most famous European and American psychologists and medical authorities. Dr. Bernfeld has made a special study of the mental phenomena of the infant during its first year of life, and his book is a comprehensive and intensive treatise on the child from the day of birth to the day it is weaned. Special attention is given to the mental aspects of sleeping, crying, nursing, and the development of the senses; as well as to the growing instincts of mastery, as illustrated by the use of the hands and legs in sitting, crawling, standing, and walking. Every parent should profit by the vast amount of information contained in *The Psychology of the Infant*.

1001 CELESTIAL WONDERS, by Charles Edward Barnes. 294 pages, profusely illustrated, stiff leather covers, size 7" by 4¾". Published by the Pacific Science Press, Morgan Hill, California. Price, $2.50.

This is the second edition of a book which has become immensely popular among amateur astronomers. The first section of the volume deals with the various stars, galaxies, and planets, with the approved methods of observing and listing them, and with the drawing of charts of the heavens at various periods of the year. There is a great deal more information in this very fascinating section than the amateur astronomer will ever, in all probability, require; it may be said that it tells all that one wishes to know about the heavens. The second section of the book deals with the construction of various types of telescopes and astronomical instruments, such as spectroscopes and telescopic cameras. Every technical detail of construction is worked out for those who wish to build their own apparatus. One may build a 10-inch reflecting telescope for less than $10.00; whereas the price of such an instrument, if purchased outright, usually mounts into the hundreds of dollars.

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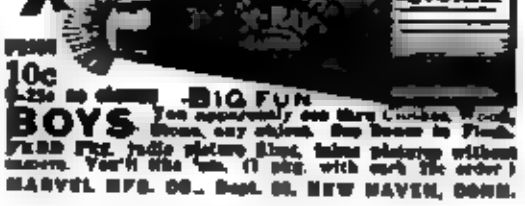

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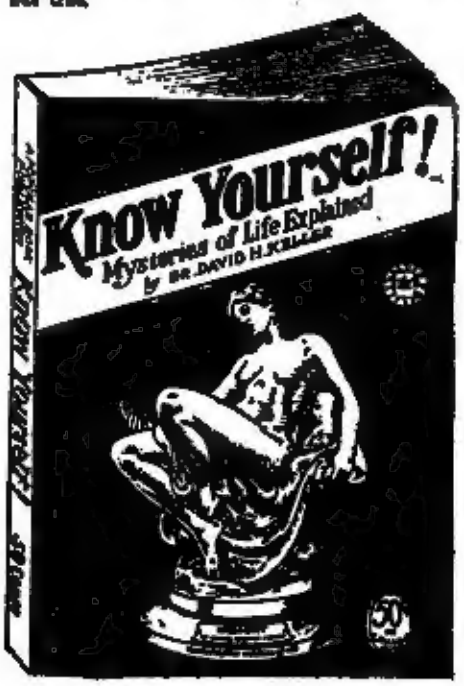

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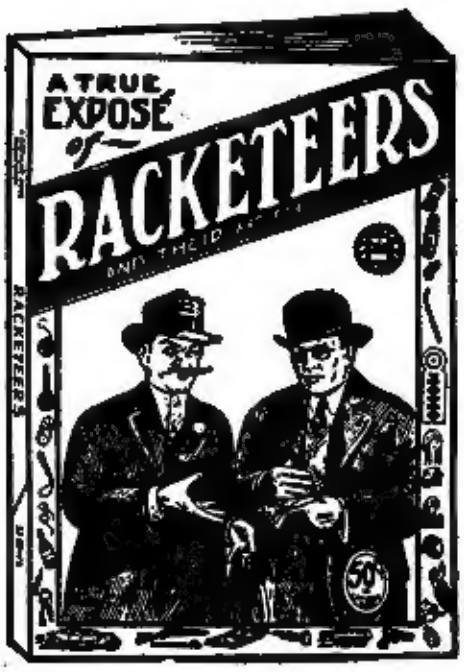

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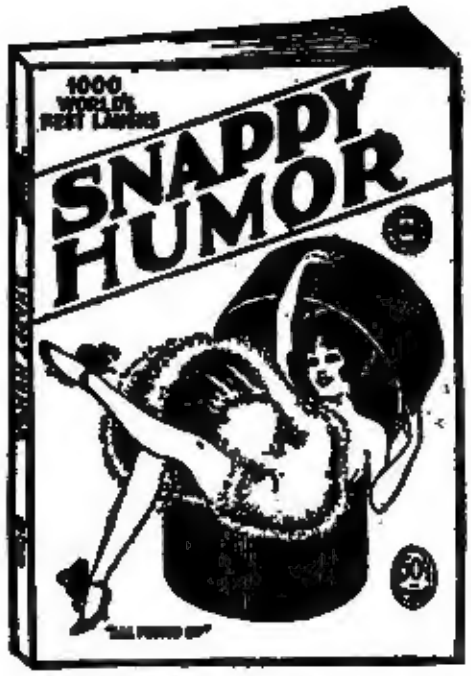

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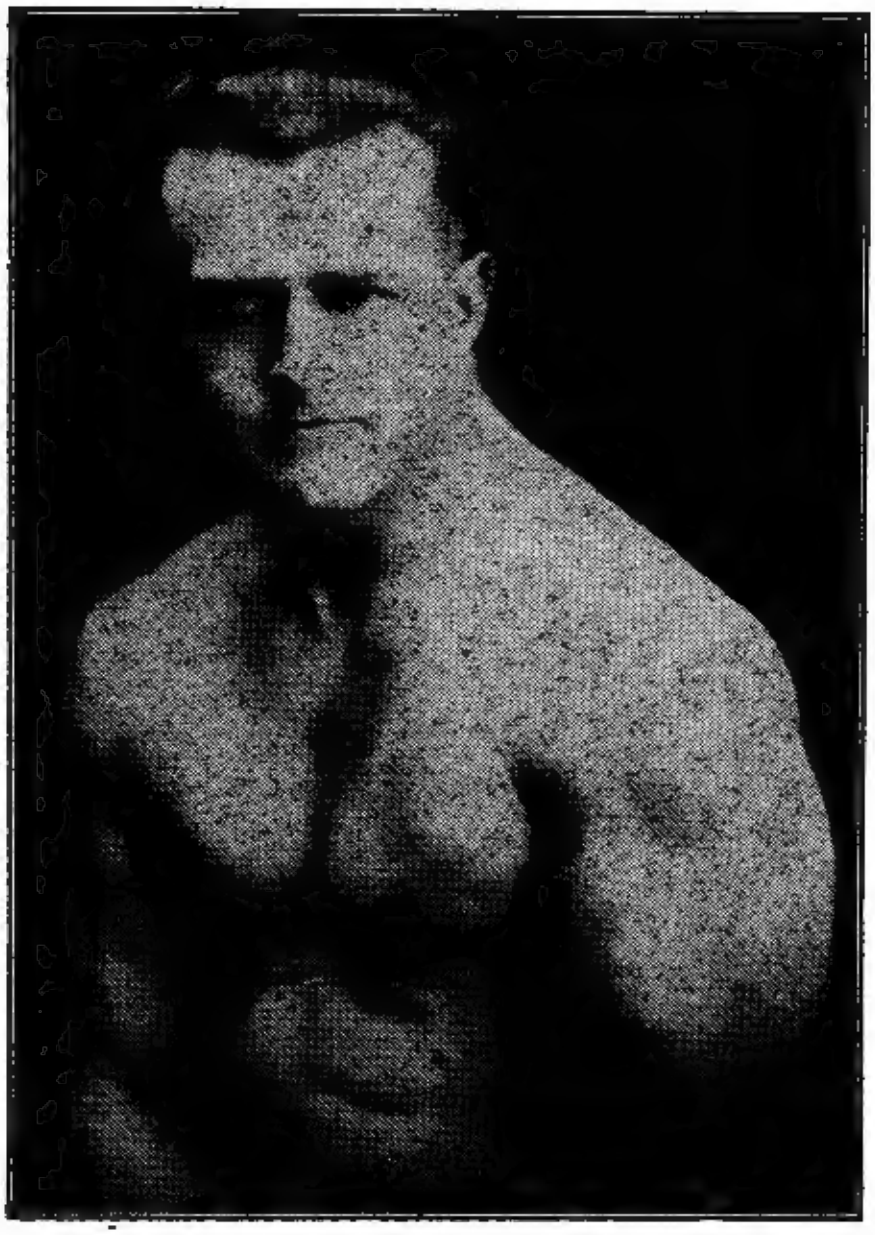

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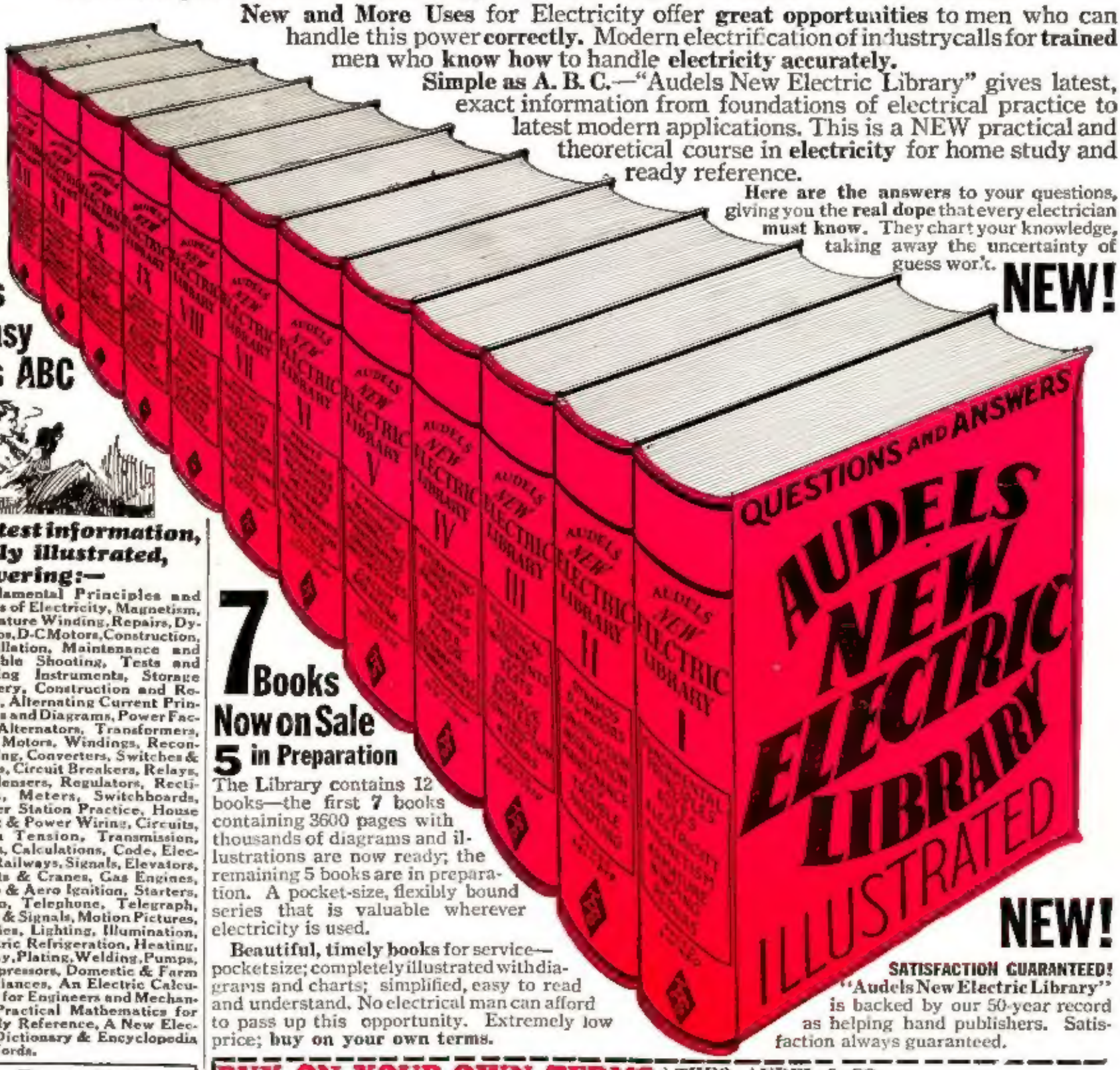

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